News about

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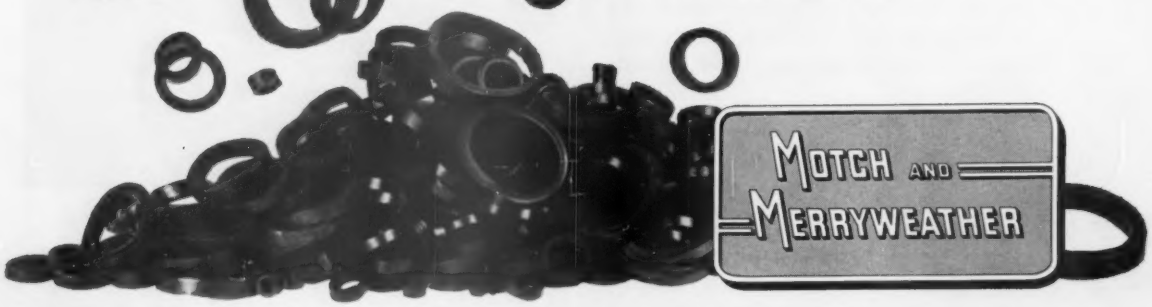

Rubber Age

COVERING THE MANUFACTURE OF RUBBER AND RUBBERLIKE PLASTICS PRODUCTS

APRIL, 1960 VOL. 87, NO. 1

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Highlights Sidelights *of the News . . .*

April, 1960

In an attempt to clarify the significance of the Food Additives Amendment to the rubber industry, the Rubber Manufacturers Association has compiled a series of typical questions and their answers . . . The answers, contributed by officials of the Food and Drug Administration, will assist rubber manufacturers in assessing implications of the new legislation (page 88).

Current reports state that McNeil Machine & Engineering Co. of Akron, Ohio, has offered to purchase F. E. Myers & Brothers Co. of Ashland, Ohio, for a reported $12 million or $60 a share of common stock . . . According to McNeil, a contract for the sale is being prepared for submission to Myers' stockholders for approval (page 96).

U.S. Rubber Co. has agreed to sell its plant at Fort Wayne, Ind., to the International Harvester Co. . . . Terms of the purchase were not revealed . . . The Fort Wayne plant is adjacent to International Harvester's Fort Wayne works (page 98).

Sun Rubber Co. of Barberton, Ohio, has filed a registration statement with the Securities and Exchange Commission which proposes a public offering of $1 million of 6 per cent subordinate debentures due April 1, 1975 . . . This is part of a $2,750,000 financing program which includes a $750,000 mortgage loan and a $1 million loan from McNeil Machine & Engineering Co. (page 99).

Cooper Tire & Rubber Co. has leased the 140,000 square foot plant at Auburn, Ind., formerly occupied by the Auburn Rubber Co. . . . Cooper expects to start production operations at the Auburn site in the very near future . . . The Auburn facility is equipped to manufacture industrial rubber products (page 106).

Polymer Industries, Inc., has reported the completion of its new $500,000 production and laboratory facility at Springdale, Conn. . . . Work has already begun on a new polymerization plant and on a new solvent mixing plant to be located at the company's present site (page 109).

Naugatuck Chemical Division, U.S. Rubber Co., will construct a new technical center near its main plant in Naugatuck to broaden research for new products and speed technical service . . . Construction is scheduled to begin in mid-1960 with completion expected in 1961 (page 118).

The Canadian government has turned down an offer of $75 million for the Crown-owned Polymer Corp., Ltd. at Sarnia, Ont. . . . The plant cost $48 million to construct and commenced production in 1944 (page 128).

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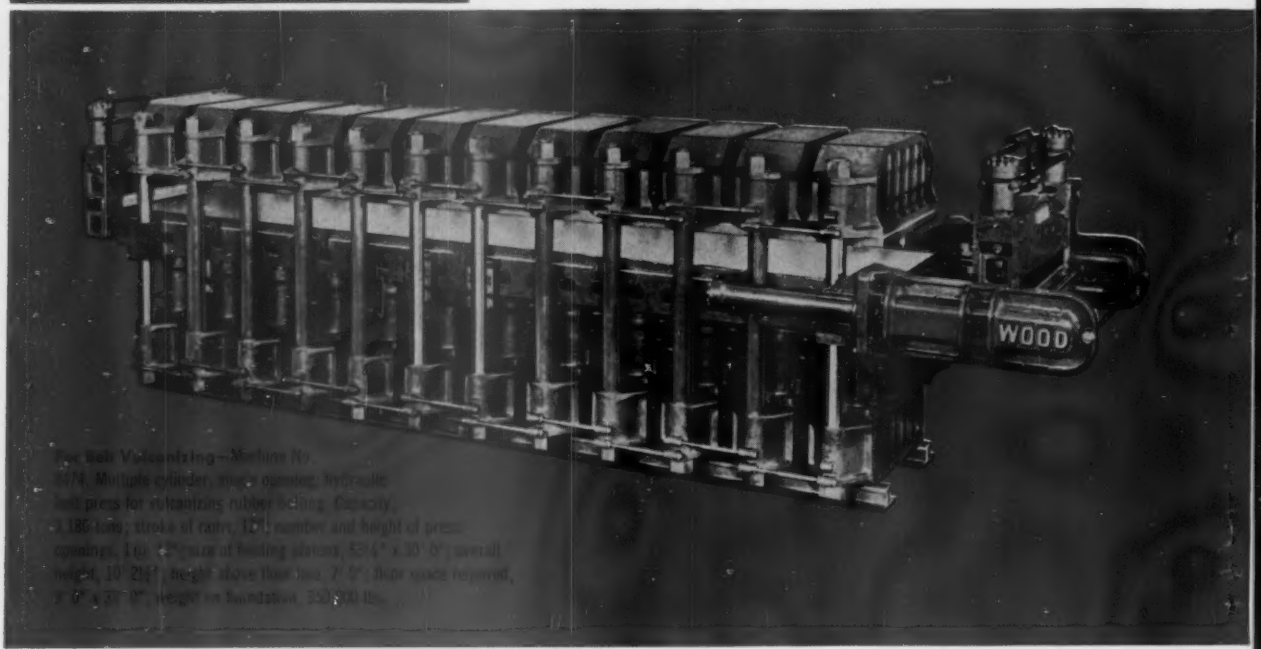
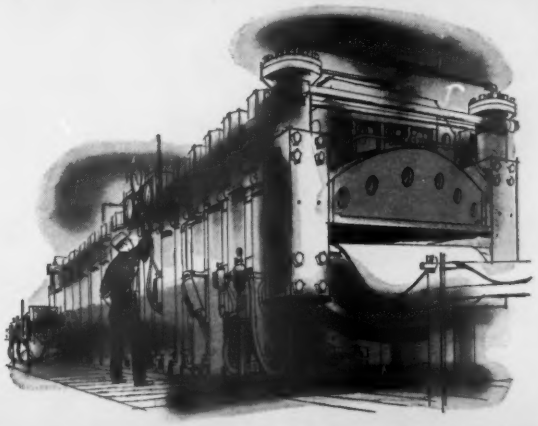
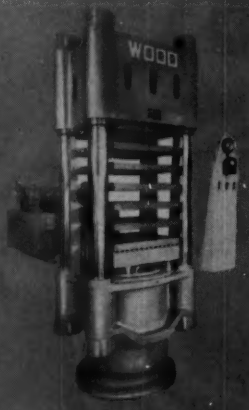
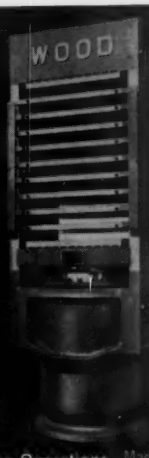


PRESSES...

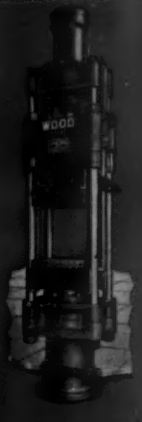




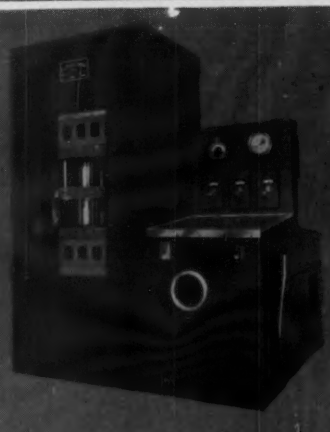
For Curing Operations—Machine No. 9420. Self-contained, multiple opening, four-column press. Capacity, 1,200 tons; stroke of ram, 36"; size of heating platens, 42" x 42"; number and height of press openings, 6 @ 6"; approach and return speed, 50"/min.; pressing speed, 2.5"/min.; height of press, 15' 6"; floor space, 6' x 11' 3"; weight on foundation, 80,000 lbs.



For Curing Operations—Machine No. 9448. An accumulator operated, multiple opening, slab-side press. Capacity, 1,100 tons; stroke of ram, 40"; size of heating platens, 42" x 42"; number and height of press openings, 10 @ 4"; height of press, 13' 10"; floor space required, 5' 1" x 4' 4"; weight on foundation, 75,000 lbs.



For Molding Operations—Machine No. 4175. A four-column transfer pot hydraulic molding press. Capacity, 150 tons; stroke of clamping ram, 22 3/8"; stroke of transfer cylinder ram, 18"; die space, and size of top platen, 24" x 24"; daylight between hot plates, 77¼"; height of press, 13' 6¼"; floor space, 3' 0" x 3' 6"; weight on foundation, 14,500 lbs.



For Molding Operations—Machine No. 8540. Self-contained press, with steam or electrically heated platens. Capacity, 570 tons; stroke of ram, 17"; size of heating platens, 22" x 22"; press openings, 2 @ 8½"; approach speed and return, 26.2"/min.; pressing speed, 2.3"/min.; height of press, 9' 10"; floor space, 5' 9¼" x 6' 5¼"; weight, 26,000 lbs.

For Molding Operations—Machine No. 9318. Self-contained, single-opening steam platen press. Capacity, 200 tons; stroke of ram, 10"; height of openings (adjustable), min. 5", max. 20"; heating platens, 48" x 48"; closing and pressing speed, 4"/min.; return speed, 20"/min.; height, 6' 7½"; floor space, 4' 0" x 8' 6"; weight on foundation, 26,600 lbs.

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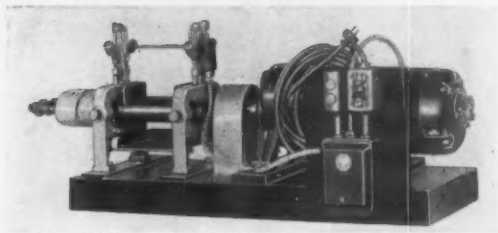

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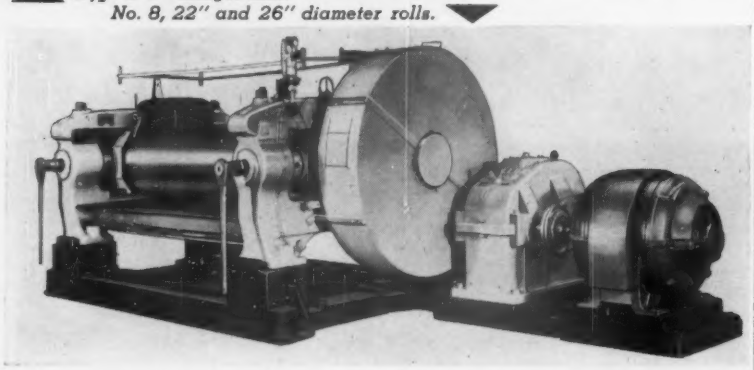

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News in Brief

► Naugatuck Chemical Division of U. S. Rubber Co., Naugatuck, Conn., is offering two bulletins on "Paracril OZO." Bulletin No. 230 is about "Black Extrusion Compounds," and Bulletin No. 231 is about "Compounds for Aeronautical Materials Specifications."

► J. M. Huber Corp., 630 Third Ave., New York, N. Y., has issued a new set of pages on its "Aerfloted" and "Water Fractionated" clays, which are to be added to the "Huber Rubber Products Manual." Compounding data demonstrate the differences in the major types of these clays.

► Colonial Rubber Co., Ravenna, Ohio, has issued new bulletins containing full information on recent price reductions on certain Silicol rubbers in sheet form. The new prices given apply to Silicol meeting AMS 3302-B, AMS 3304-B, and Mil-R-5847-A specifications. Copies of the new price sheets can be obtained from Colonial Rubber Co. in Ravenna.

► Enjay Co., New York, N. Y., has released four technical information sheets on butyl. Sheet 32 contains data on low cost RHW-RHH butyl insulation compounds; Sheet 33 deals with butyl transfer-molding compounds; Sheet 35 describes the properties of high tensile strength butyl-polyethylene sponges; and Sheet 36 has data on compounding Enjay butyl for dynamic properties.

► B. F. Goodrich Chemical Co., Cleveland, Ohio, has published its Hycar Technical Newsletter, Volume 7, Number 3. This eight-page newsletter covers such subjects as compounding Hycar for abrasion resistance; top lift compounds; high quality heel compounds; cured-in-place shoe soles; translucent shoe sole compounds; and hard rubber wheels.

► Elastomer Chemicals Department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has issued three bulletins: BL-359 on Saran as a cure activator for Neoprene latex compounds; BL-360 on Viton in mechanical goods; and Report No. 59-4 on the properties and compounding ingredients of Viton B.

► Engineered Materials, New York, N. Y., has made available a data sheet on Bright Gold Flake, a non-metallic mineral which contains no free metal and has no metallic coating. The flake, made from Vermiculite, can be flocked for many decorative effects onto any surface adhesive. The data sheet, FG-61-59, contains typical physical properties, typical screen analysis, and typical chemical analysis.

Photograph taken with the cooperation of Kleistone Rubber Company, Warren, R. I.

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Pliofle—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

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Pliofiex, Pliolite, Wing-Stay–T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

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Pliolite—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

coming events

April 18-19. Conference on Automatic Techniques, Sheraton Cleveland Hotel, Cleveland, Ohio.

April 19. Association of Consulting Chemists & Chemical Engineers, Forum Meeting, Hotel Shelburne, New York, N. Y.

April 20. Quebec Rubber & Plastics Group, Technical Meeting, Queen's Hotel, Montreal, Quebec, Canada.

April 20. Washington Rubber Group, Field Trip to Kelly-Springfield Plant, Cumberland, Md.

April 22. Chicago Rubber Group, Technical Meeting, Furniture Club, Chicago, Ill.

April 22. Detroit Rubber & Plastics Group, Spring Meeting, Detroit Leland Hotel, Detroit, Mich.

April 24-May 3. German Industries Fair, Hanover, West Germany.

April 25-26. American Institute of Electrical Engineers, 12th Annual Rubber and Plastics Conference, Sheraton Hotel, Akron, Ohio.

April 25-26. American Society of Mechanical Engineers, Maintenance and Plant Engineering Conference, Chase and Park Plaza Hotels, St. Louis, Mo.

April 25-26. Society of the Plastics Industry (Canada), 18th Annual Canadian Section Conference, London Hotel, London, Ontario, Canada.

April 27-29. Second European Symposium on Chemical Reaction Engineering, Amsterdam, The Netherlands.

April 29. Philadelphia Rubber Group, Technical Meeting, Poor Richard Club, Philadelphia, Penna.

May 2-3. American Standards Association, Company Member Conference, Sheraton Hotel, Philadelphia, Penna.

May 3. Los Angeles Rubber Group, Biltmore Hotel, Los Angeles, Calif.

May 3-6. Division of Rubber Chemistry, American Chemical Society, Spring Meeting, Statler Hotel, Buffalo, N. Y.

May 3-13. International Mechanical Handling Exhibition and Materials Handling Convention, London, England.

May 4-5. Wire Association, Electric Wire & Cable Section, Regional Meeting, Sheraton Hotel, Pittsburgh, Penna.

May 4-14. Fourth Annual United States World Trade Fair, New York Coliseum, New York, N. Y.

May 5. National Bureau of Standards, Division of Organic and Fibrous Materials, Lecture Series on Chemistry and Physics of High Polymers, Materials Testing Laboratory, Washington, D. C.

May 9-12. Instrument Society of America, Summer Instrument-Automation Conference & Exhibit, Civic Auditorium, San Francisco, Calif.

May 11-13. Society of the Plastics Industry, National Conference, Americana Hotel, Bal Harbor, Fla.

May 12. Northern California Rubber Group, Elks Club, Berkeley, Calif.

May 14-29. Foire de Paris, Sixth Exposition of Plastics Materials and Rubber, Parc des Expositions, Paris, France.

May 15-18. Twenty-Fifth Annual International Distribution Congress and Business Aids Show, Statler Hilton Hotel, Buffalo, N. Y.

May 16-17. Chemical Specialties Manufacturers Association, 46th Midyear Meeting, Drake Hotel, Chicago, Ill.

May 16-17. Chemical Market Research Association, Annual Meeting, Hotel Biltmore, New York, N. Y.

May 17-19. American Society of Mechanical Engineers, Production Engineering Conference, Hotel Schroeder, Milwaukee, Wisc.

May 18-20. Society for Experimental Stress Analysis, Spring Meeting, Hotel Severin, Indianapolis, Ind.

May 20. Connecticut Rubber Group, Technical Meeting.

May 20. New York Rubber Group, First Annual Dinner-Dance, Roosevelt Hotel, New York, N. Y.

May 20-31. International Plastics Exhibition, Oslo, Norway.

May 23-26. American Society of Mechanical Engineers, Design Engineering Conference and Show, Statler Hilton Hotel, New York, N. Y.

May 23-27. American Textile Machinery Exhibition, Atlantic City, N. J.

May 23-28. Instruments, Electronics and Automation Exhibition, London, England.

May 27. Rubber Chemical Salesmen's Association of Akron, University Club, Akron, Ohio.

June 1-3. Association of American Battery Manufacturers, Spring Convention, Ambassador Hotel, Los Angeles, Calif.

June 1-3. Instrument Society of America, 6th Annual Instrumental Methods of Analysis Symposium, Montreal, Quebec, Canada.

June 3-12. International Trade Fair, Expo Oresund, Helsingborg, Sweden.

June 3-5. Los Angeles Rubber Group, Summer Outing, Hotel Del Coronado, Coronado Island, Calif.

June 3. Quebec Rubber & Plastics Group, Annual Golf Tournament, Ste. Hyacinthe Golf Club, Ste. Hyacinthe, Quebec, Canada.

June 4. Southern Ohio Rubber Group, Summer Meeting, Inland Activities Center, Dayton, Ohio.

June 5-10. American Society of Mechanical Engineers, Semi-Annual Meeting & Aviation Conference, Statler Hilton Hotel, Dallas, Texas.

June 5-10. Society of Automotive Engineers, Summer Meeting, Edgewater Beach Hotel, Chicago, Ill.

June 5-9. Society of the Plastics Industry, 9th National Plastics Exposition and Conference, New York Coliseum and Commodore Hotel, New York, N. Y.

June 5-9. World Power Conference, Madrid, Spain.

June 8-11. National Society of Professional Engineers, Annual Meeting, Statler Hotel, Boston, Mass.

June 9. New York Rubber Group, Summer Outing, Doerr's Grove, Millburn, N. J.

June 9. Rhode Island Rubber Group, Summer Outing.

June 9-10. Wire Association, Pacific Coast Regional Meeting, Statler-Hilton Hotel, Los Angeles, Calif.

June 9-11. Manufacturing Chemists' Association, 88th Annual Meeting, Greenbrier, White Sulphur Springs, West Va.

June 10. Fort Wayne Rubber & Plastics Group, Golf Outing.

June 10. Northern California Rubber Group, Golf Outing.

June 10-11. Southern Rubber Group, Technical Meeting, Dinkler-Tutwiler Hotel, Birmingham, Ala.

Sept. 13-16. Division of Rubber Chemistry, American Chemical Society, Fall Meeting, Hotel Commodore, New York, N. Y.

October 4-7. International Rubber Conference, West Berlin, Germany.

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Depending on the type of Regal black used, you can profit at least 3 significant ways. 1) *You save money* by choosing a Regal black to replace more costly blacks of another type. 2) *You save 'headaches'* because you are assured uninterrupted supply, unaffected by rising costs or limited availability of natural gas. 3) *You open up entirely new product possibilities* — because Regal blacks incorporate features never before available in *any* grade of carbon black.

Regal blacks are now in commercial production and available world-wide—another step in Cabot's long-range program to meet threatened gas shortages and rising natural gas prices. For complete information write:

CABOT® **GODFREY L. CABOT, INC.**
125 HIGH STREET, BOSTON 10, MASSACHUSETTS

Performance Characteristics of 3 New Regal Blacks

REGAL 300
an excellent channel replacement oil black, combining virtually identical channel black properties with the faster curing rate of HAF types.

REGAL 600
a striking combination of low hardness/high tread wear resistance never before provided by a carbon black, offering interesting product improvement possibilities.

REGAL SRF
the first oil furnace SRF black. Matches, and in some cases excels performance of gas-produced SRF blacks.

how to vastly increase the useful life of rubber...

Effect of Curing System on Antiozonant Retention in SBR Stocks after Vulcanization

(All contain 3.0 phr UOP 88; 40.0 phr HAF black)

Compound	Accelerator	Sulfur, phr	% Extractable Antiozonant
1082....	2.0 phr benzothiazyl disulfide	2.0	66.4
1083....	1.0 phr benzothiazyl disulfide	2.0	79.6
1087....	None	2.0	~ 100.0
1088....	1.0 phr benzothiazyl disulfide	3.0	74.6
1083....	1.0 phr benzothiazyl disulfide	2.0	79.6
1089....	1.0 phr benzothiazyl disulfide	1.0	88.6
1083....	1.0 phr benzothiazyl disulfide	2.0	79.6
1084....	1.0 phr N-cyclohexyl-2-benzothiazole sulfenamide	—	—
1093....	1.0 phr diphenylguanidine	2.0	~ 18.0
1085....	2.0 phr tetramethylthiuram disulfide	—	35.0
1090....	4.0 phr tetramethylthiuram disulfide	—	12.9

The SBR specimens below were exposed to ozone at 100°F with 20 percent elongation for 52 hr. at 33 pphm ozone, then 187 hr. at 63 pphm ozone.

Carbon black—HAF (high abrasion furnace), Curing system—4 phr tetramethylthiuram disulfide; Hours to first crack—7 to 23.

Carbon black—HAF (high abrasion furnace), Curing system—2 phr sulfur, 1 phr N-cyclohexyl-2-benzothiazole sulfenamide. No cracks in 239 hr.

CONSIDER THE EFFECT OF YOUR CURING SYSTEM ON THE EFFECTIVENESS OF A CHEMICAL ANTIOZONANT

In compounding rubber, there are several things which are important in assuring maximum crack-free life. First, you must use a potent antiozonant like UOP 88 or 288. Next, consider what a vast difference in effectiveness can be realized by your *curing system.*

The right antiozonant used in correct proportion is of primary importance. Then, by using the proper accelerator, you can promote its maximum effectiveness, and thus contribute to maximum ozone protection.

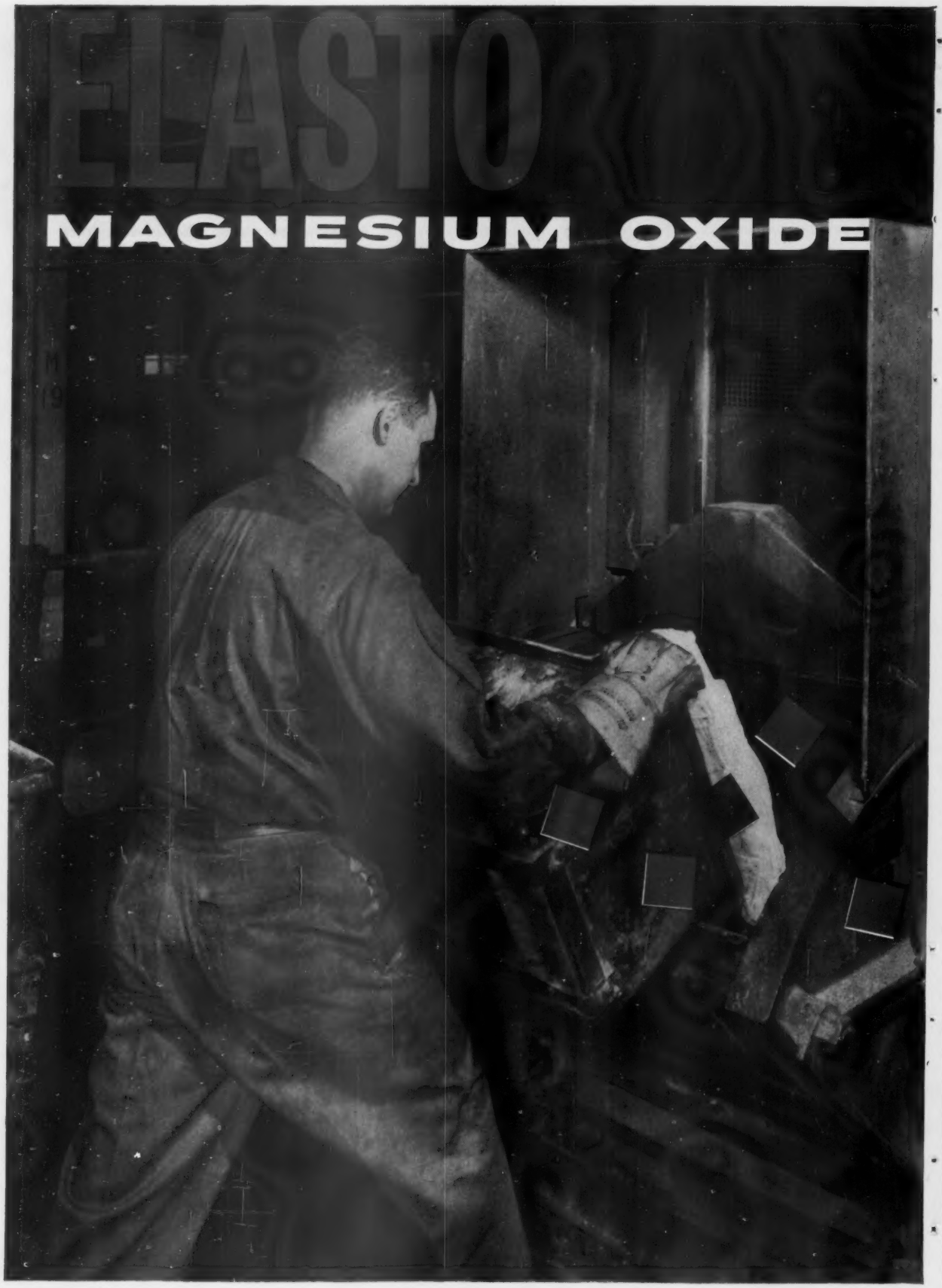
Look at the two rubber test strips illustrated. Both were formulated with UOP 88 . . . but note how much more effectively the antiozonant worked when accompanied by this change in curing systems—a vast increase in resistance to cracking. The table above the test strips shows how the *proper* accelerator aids antiozonant effectiveness.

Help in achieving maximum effectiveness from UOP 88 or 288 antiozonants in your rubber formulations is available through UOP facilities and technical personnel. Just write or telephone our Products Department.

WHERE RESEARCH TODAY MEANS PROGRESS TOMORROW

UOP®
UNIVERSAL OIL PRODUCTS COMPANY
30 Algonquin Road,
Des Plaines, Illinois, U. S. A.

UOP ozone cabinets provide test conditions at a wide range of ozone concentrations.


ELASTO
MAGNESIUM OXIDE

...cuts throw-away losses from hot, scorchy stocks!

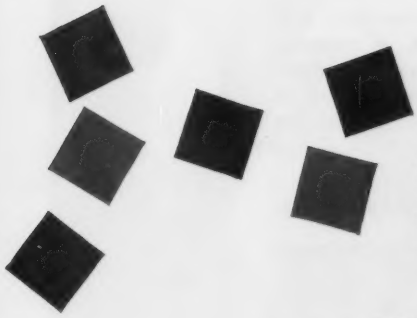
Morton's new activity-controlled oxides minimize scorch, improve bin stability ...give you higher-quality rubber

Pick the process safety you want . . . and get it *every* time with new Morton ELASTOMAG oxides! This new Morton development lets you use sensitive elastomer recipes without guesswork, or risk of loss! For the first time, you can predict process and curing aid performance with complete accuracy. This simplifies scheduling . . . boosts production . . . profits, too!

Three ELASTOMAG activity grades—high, medium, and low—make it easy to use sensitive recipes time after time without trouble. Each grade is held within extremely close limits on the Morton Activity Index scale for precisely predictable performance.

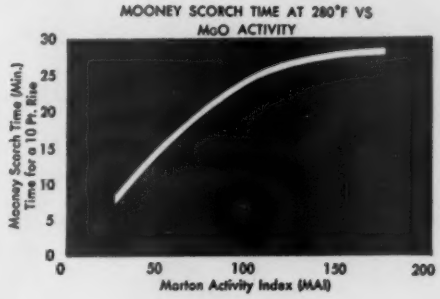
New Morton Activity Index (MAI) simplifies the use of magnesium oxide. It tells you the speed at which oxide will react . . . lets you choose an ELASTOMAG with the MAI value that provides best process safety, rate of cure, and state of cure. Morton researchers have proved that MAI—when used with oxides having superior dispersion—is a precision tool for predicting performance. Morton's new ELASTOMAG oxides are based on this research.

New ELASTOMAG Micro-Pellets—Dusting problems are minimized by Morton's new Micro-Pelletizing process. No binder or treating agent is used. In the mixer, Micro-Pellets break down to minute particles . . . provide the same superior dispersion as ELASTOMAG in the powdered form.



Predict process safety with new accuracy

Here's how Morton ELASTOMAG controls Mooney Scorch time. Notice how oxides with high Morton Activity Index (MAI) values give maximum safety. ELASTOMAG grades available have MAI ratings of 20, 100, and 170.



There's an ELASTOMAG oxide that can increase production in your plant. Ask your Morton Man for technical information and a copy of Morton's new ELASTOMAG bulletin. Distributors are listed below. Phone or write now.

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Akron, Ohio

Ernest Jacoby & Company
585 Boylston Street
Boston 16, Massachussetts

O'Connor & Company
4667 North Manor Avenue
Chicago 25, Illinois

H. M. Royal, Inc.
689 Pennington Avenue
Trenton, New Jersey

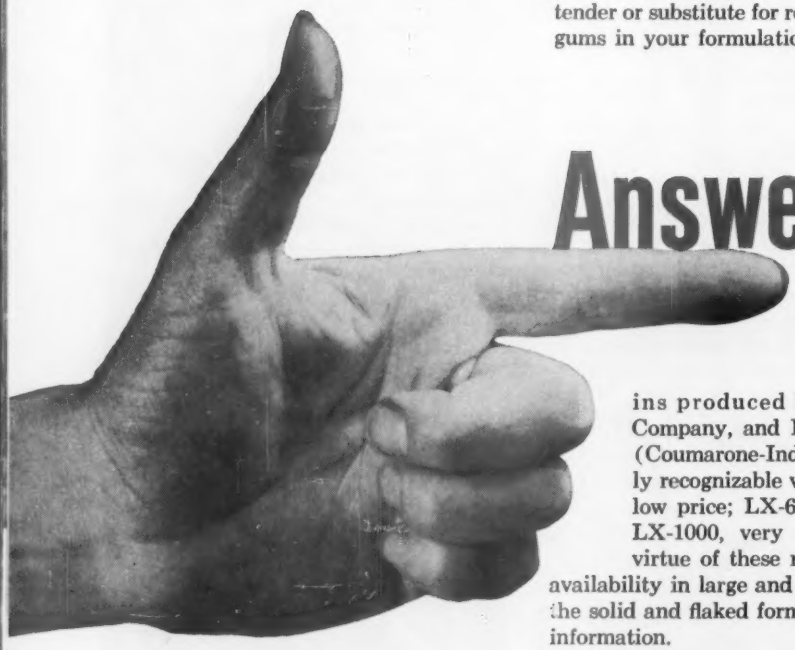
H. M. Royal, Inc.
11911 Woodruff Avenue
Downey, California

MORTON CHEMICAL COMPANY
110 N. Wacker Drive—Chicago 6, Illinois—Financial 6-6760

Photo courtesy of Chicago Rawhide Company

Question:

Has scarce supply caused you to look for an extender or substitute for rosins, wood rosins or ester gums in your formulations?



Answer:

If so, we suggest you experiment with the LX series of hydrocarbon resins produced by Neville Chemical Company, and Neville's full line of C-I (Coumarone-Indene) resins. Immediately recognizable virtues are: LX-782, very low price; LX-685, high versatility; and LX-1000, very light color. A common virtue of these resins is their immediate availability in large and small quantities, both in the solid and flaked form. Write to us for further information.

Neville Chemical Company · Pittsburgh 25, Pa.

NEVILLE®

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UNITANE® 0-220

TITANIUM DIOXIDE

Save – through minimum loading – with UNITANE 0-220, yet get maximum whiteness in the bargain! The high opacity and clear color tone of this pigment give it maximum whitening power; you load less, get better results!

UNITANE 0-220 also eliminates some of the trouble spots in processing. It wets easily, is readily dispersible and is non-reactive with rubber chemicals. UNITANE 0-220 maintains its brilliancy throughout curing and aging, assuring a better-looking finished product with longer-lasting whiteness.

For economy, easier processing and product improvement, specify UNITANE 0-220. Just ask your Cyanamid Pigments representative for samples and full information.

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Pigments Division
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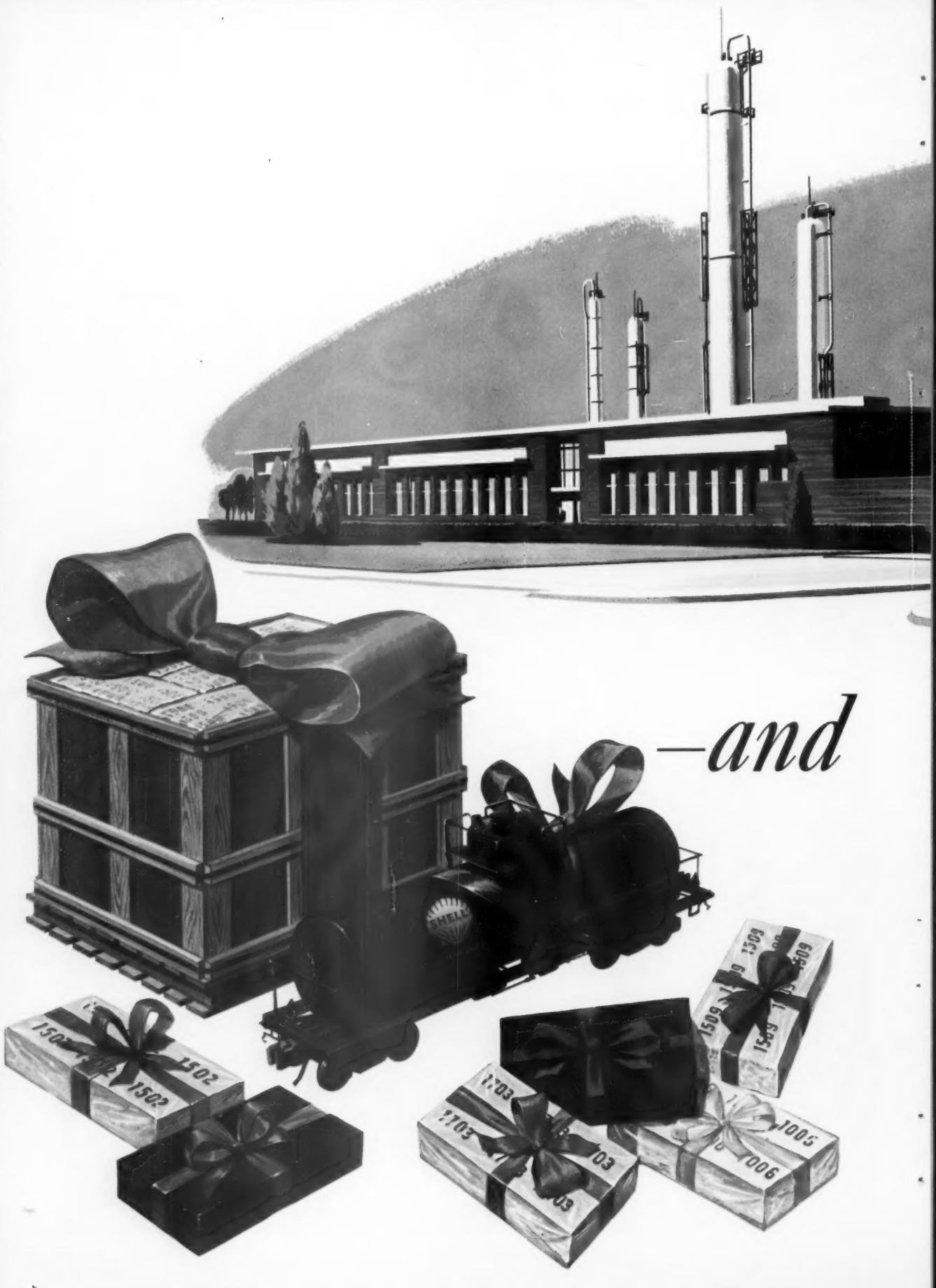
—and

more to grow on

Soon, there will be an important birthday in the rubber industry. Just five years ago, private ownership of the nation's SBR manufacturing facilities came into being.

A lot has happened in these years. Important new polymers have been developed. There are now more and better types of SBR to choose from. And in addition, private enterprise has provided its customers with improved distribution, advanced packaging, and readily available technical services.

An outstanding example is the plant at Torrance, California—the only fully integrated operation for the manufacture of styrene, butadiene and rubber—today the home of Shell Chemical Company's Synthetic Rubber Division.

In the past five years, the number of Shell S-Polymers has been doubled. Improved hot, cold, and oil-extended polymers; new black and resin-rubber masterbatches; hot and cold latices have been added since the first list of S-Polymers appeared. In addition, Torrance is now producing the world's first commercial synthetic polyisoprene—Shell Isoprene Rubber—closely similar to natural rubber.

Packaging such as the Flotainer®, which controls cold flow and saves storage space, has been developed at Torrance. Buying Shell rubber has been made easier with the addition of sales offices in Cleveland and New York—as well as six warehouses conveniently located throughout the United States.

Technical service is another advantage offered to Shell customers. Many producers of finished rubber goods work closely with Shell in developing special techniques and formulations.

Your Shell representative can tell you more about the complete Shell line of general purpose rubber, new polymers, and technical service. *Just write or telephone the Shell Chemical office nearest you.*

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Buy it for whiteness and brightness!

A-420 is a specially prepared anatase titanium dioxide designed to produce brilliant whiteness and clear tints in rubber products.

You can depend upon its uniformity. Like all Horse Head pigments, it's produced under a quality-control system unexcelled in the white pigment industry.

Send for a test sample now. Check it against your color and brightness standards.

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LOS ANGELES

• Texas Butadiene Chemical International, Ltd., will contribute $39 million to an Argentine corporation to build a petrochemical installation in Inerto Deseado, Santa Cruz. Factories at the installation will go on stream in 1962 with an initial capacity of 30,000 tons of butadiene; 40,000 tons of synthetic rubber; and 15,000 tons of carbon black. Later, production of the new installation will be increased to 42,000 tons of butadiene; 60,000 tons of synthetic rubber; and 25,000 tons of carbon black.

• Farbenfabriken Bayer, A.G., in Leverkusen, and its Canadian subsidiary, Bayer Foreign Investment, Ltd., Bayforin, have formed a new corporation which will build a factory for the production of isocyanates, polyesters and polyethers in Pont-de-Claix (Isére), France.

• Production of German rubber goods has increased by 12 per cent in 1959, according to preliminary estimates. The value of the rubber goods produced during 1959 amounted to 3 billion German marks (almost $750 million). More than half a million metric tons of various rubber goods were produced and more than 100,000 people were employed. Approximately 190,000 tons of crude rubber were used for the manufacture of various products. Output of tires increased by 15 to 20 per cent, whereas production of rubber goods increased only by 5 to 7 per cent.

Synthetic rubber is used at an ever increasing scale; in 1958 about 30 per cent of the raw materials consumed consisted of synthetic rubber. This was increased to 33 per cent in 1959. Besides all kinds of tires and tubes, Germany manufactures a large line of rubber goods for the food industry; foam rubber of all kinds; adhesive rubbers; rubber soles and heels; rubber rollers; technical repair materials; and rubberized fabrics and garments. Export of German rubber goods was insignificant.

In 1960, the German industry expects to do as well as it did last year, particularly in view of the fact that the boom in the automobile industry continues. Consequently, demand for tires and tubes, and rubber articles utilized in the bodies of various automobiles will be considerable.

• Firestone Tire and Rubber Co. plans to produce a complete line of tires and tubes at its factory in France for all types of cars, trucks, motorcycles and agricultural machinery. Another Firestone factory for production of synthetic rubber will make butadiene, styrene and copolymers. Equipment for these factories will be delivered by French companies and most of the raw materials will be of French origin.

The Firestone factory will have no trouble selling its products. At present France is the third largest market for tires in the world, with the United States and Great Britain ranking first and second. France now has more than 5 million cars and 600,000 tractors. Increasing exports of French cars assure France third place on the world market after West Germany and Great Britain.

• Afina Rubber Works in Hanover, West Germany, a subsidiary of the Accumulatorenfabrik AG, Hanover, manufactures rubber shoes and boots. Because of increasing imports from foreign countries at very low prices, competition has become keen. For this reason, the factory, unable to meet the much lower prices, will cease operations soon. Most of the 550 workers, primarily women, will lose their jobs. The major part of the factory will be used to manufacture batteries.

• For about three years, interrupted only by a few months, representatives of the Western European tire and rim industry have held meetings to establish international standards and capacities for tires and rims. The sub-committees have succeeded in establishing standards for trucks, buses and trailers and are now attempting to accomplish the same for automobiles. It might be important to have American observers sit in on this meeting to coordinate European and American standards.

• During 1958 and 1959, General Tire and Rubber Co., Holland, N. V., Amsterdam, manufactured tires at full capacity. Because considerable stocks were on hand at the beginning of the fiscal year, more tires were sold than produced. The Dutch company closed its books at the end of 1959 showing a net profit of 250,000 Dutch Guilders ($66,000). In 1960 capacity of the factory will be increased.

• Continental Gummi-Werke,, A.G., Hanover, invested about 43.3 million DM ($13 million) for new machinery and equipment in 1958, and last year, a little more than that was spent to buy new equipment and increase productive capacity. During 1960, two new factories will be built. The first will be in Korbach and is expected to be one of the biggest

industrial installations in North-Hesse. Tires for small and medium sized cars will be manufactured in a new two-story tire factory, covering an area of 160,000 square feet. The factory will go on stream at the end of 1961. A second factory, primarily for the production of technical rubber goods, will have an area of 135,000 square feet and will be ready for production by the end of 1960. At present, the company employs 2,900 people, but will hire an additional 400 people in order to staff the two new installations.

• Persistent rumors prevail at the rubber market in Singapore that Soviet Russia has committed herself to supply China with considerable amounts of rubber. As China does not want to buy additional rubber from Indonesia, Russia would help China fill her rubber needs. It is reported that Indonesia is to be punished for her treatment of Chinese citizens. Further, China does not want to buy at high Singapore prices, which are the consequence of the Chinese boycott against that country. Well informed circles in Singapore maintain that Russia has committed herself to supply about 50,000 tons of natural rubber.

• Dunlop Rubber Co., Ltd., has patented a pneumatic safety tire assembly consisting of two tires seated on a common wheel rim with one fitting within the other to provide an air space between them. The safety tire assembly is said to be valuable for use on carrier-based aircraft since an impact-burst on deck-landing can have disastrous consequences. The outer tire may be inflated to 100 psi for normal operating loads, while the inner tire may be inflated to a greater value, say 200 psi, to prevent the outer tire from becoming crushed between the wheel and deck in a heavy landing. Both tires have separate inlet connections and valves. The development is also applicable to tires for road vehicles. In this case, the inner tire is provided with an inlet connection and valve similar to those used for the dual-chamber tubes.

• Shell, P.C.R.B., Cabot-Texas Butadiene, Michelin, Dunlop and Kleber-Colombes have organized a corporation called Societe des Elastomeres de Synthese to plan and construct a synthetic rubber plant at Berre, France. The factory will manufacture synthetic rubber of the butadiene-styrene type. Plans have been completed for the copolymerization of butadiene and of styrene as well as the general installation; the stock rooms; the shipping rooms; and all other sections of the factory. Orders for delivery of the equipment and material have been placed almost completely with French companies.

Construction has started and it is believed that the factory will go on stream in 1961 with a yearly minimum capacity of 50,000 tons of synthetic rubber of different qualities. Later, production will be increased to about 70,000 tons a year. The company also contemplates manufacturing a complete line of synthetic latices for use in industrial rubber, paint and varnish production. Butadiene-styrene latices of the common type and a latex containing a very high amount of styrene will also be produced.

• The first Hungarian factory for the production of polyvinyl chloride, having a capacity of 600 tons a year, has been built in Budapest. Two specialists from East Germany have helped to put the factory on stream. The Five Year Plan visualizes the construction of two other factories for PVC production with a total yearly capacity of 6,000 tons.

• Bridge-Stone Tire Co. of Tokyo has succeeded in polymerizing *cis*-polybutadiene using special processes. The Japanese company has filed patent claims in a number of foreign countries such as the United States, France, Great Britain, Germany, etc. Production on a large scale is expected to start within the next few years.

• Vereenigde Nederlandsche Rubberfabrieken (Heveafabrieken) and Dayco Corp., (formerly Dayton Rubber Co.) Dayton, Ohio, have extended a previous agreement on the manufacture of rubber belts for industrial and automotive purposes. A number of articles using sponge rubber (latex and plastics) will also be included. The American company, which furnishes its Dutch partner with technical know-how will contribute 50 per cent of the capital for the formation of a new company, Dayton-Hevea S.A., to sell the new line of merchandise.

• E. I. du Pont de Nemours & Co., Inc. has signed a contract with a Japanese corporation, Showa Denko, to form a joint company for the installation of a synthetic rubber factory in Japan. The initial capital of the new company will amount to approximately $2.5 million, of which Du Pont will supply 50 per cent.

• A new central rubber office has been organized in Kuala Lumpur by leading organizations of the rubber industry in Malaya including the Rubber Producers' Council; the United Planting Association of Malaya; the Replanting Boards; the Malayan Rubber Fund Board; the Natural Rubber Development Board; and several others. The Rubber Producers' Council will be responsible for the management of the new office.

for electrical insulation that must take it...

MARBON 8000® AE

REINFORCING HIGH-STYRENE RESIN

In frigid northern climate or in the humid tropics . . . for use with hot industrial machinery or with telephone wires . . . electrical insulation compounds, modified with Marbon 8000 AE resin give superior performance.

This hydrocarbon resin also offers proven production advantages: fast, smooth extrusion at lower mixing temperatures, with less scorch . . . good resistance to heat aging . . . high tear and cut resistance . . . low moisture pick up . . . maximum electrical properties and flexibility of compounding with reduced overall cost.

For your next SBR wire insulation compound that must really take it, specify Marbon 8000 AE resin.

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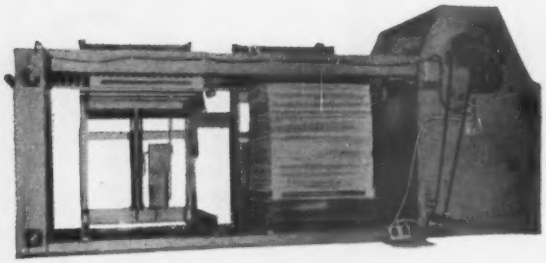
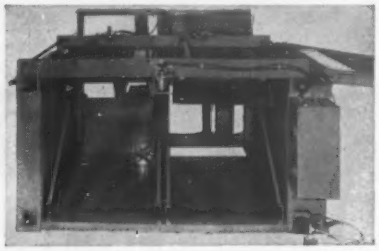
INCREASE PRODUCTION . . . DECREASE COSTS
WITH
NEW HIGH SPEED
Automatic
Cutting and Stacking Units

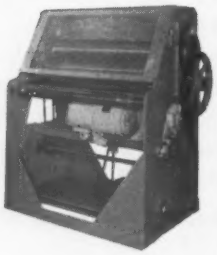


These highly efficient machines are furnished separately or as a complete self-contained unit for automatic cutting and stacking of materials from extruders, mills, calenders, and other processing lines. The Alfa Rotary Cutter is complete with a variable drive for automatic synchronization to the material speed, and length of cut can be easily and infinitely adjusted within the given range. Alfa Stackers are available with single or double stacking units. They accommodate a wide variety of materials and stack on lowering skids that are easily handled by fork truck.



CUTTING and STACKING FEATURES . . .

- Blades easily adjusted to micrometer exactness
- Cuts and stacks at speeds up to and exceeding 100 ft./min.
- Handles material widths from 24" to 50"
- Cuts lengths from 24" to 60"
- Stack per skid 40" high, max. skid load 4000#



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Illinois Office: P. O. Box 328, La Grange Phone: FLeetwood 4-4811
Representative for Alfa Machine Co.

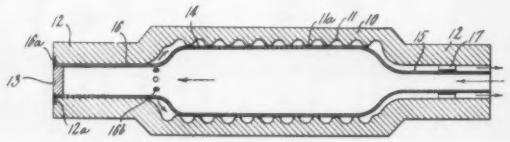
PATENT REVIEW

by Melvin Nord

Heat Exchange Roll

U. S. Patent 2,908,486, issued Oct. 13, 1959, to Harold A. Thornburg and assigned to United States Rubber Co., provides a roll for working rubber with heat transfer means for maintaining a uniform roll surface temperature.

As shown in the diagram, roll (10) has hollow trunnions (12) at each end, one of them closed by a plug (13). The interior surface (11) of the roll forms an enlarged central cavity provided with a helical rib (11a) which has an internal diameter about two and one half times that of the trunnions. This rib produces a higher rate of heat transmission by increasing the internal surface area of the roll and by permitting a decrease in roll wall thickness. No loss of roll strength occurs because no two points in the groove adjacent to the rib are diametrically opposite each other. Therefore, there are no weak sections such as those found in rolls having a series of interconnected annular or longitudinal grooves.



Within the cavity of roll (10) there is a heat conductive tube (14) constructed of a relatively thin-walled, highly conductive metal such as aluminum or copper. This tube is provided with an inlet (15) and an outlet end (16), each of which extends into the trunnions (12). The inlet end is secured to one of the trunnions by means of a spider (17). The outlet end is secured to the other trunnion in any suitable manner, preferably by means of a press fit.

In operation, the roll (10) and tube (14) rotate together. As indicated by arrows, the heat transfer medium flows into the central portion of the tube through the opening of inlet end (15) in one direction. Then it flows out from the numerous apertures (16b) in outlet end (16), through the helical passage formed by rib (11a) and the central portion of tube (14), around inlet end (15) in trunnion (12), and out of the roll, in the opposite or counter direction. It is apparent that the fluid medium may heat or cool the roll depending upon the effect desired.

Let us stretch your R-U-B-B-E-R with Polymel DX40

Polymel DX-40 is a low Gravity (1.01) Plasticizing extending resin - - a modified type of styrene. It is highly dielectric

ITEM	A	B	C
SBR-1502	57.5		
HIGH STYRENE SBR-1507MB 50-50	85.		
POLYMEL DX-40	20	30	40
POLYMEL ACTISIL	1.5	1.5	1.5
ZEOLEX 23	60		
ZINC OXIDE	5		
SANTOCURE	2.		
L-60	1.		
D.O.T.G.	0.5		
STEARIC ACID	2.		
SULPHUR	2.5		
TOTALS	242.0	252.0	262.0

COMPOUNDS SHOWN

MIXED ON LABORATORY MILL WITH 6x12 INCH ROLLS. MOONEY SCORCHES @ 250° F. SMALL ROTOR.

COMP.	Δ5	Δ30
A	24 MIN.	27 MIN.
B	28 MIN.	32 MIN.
C	36 MIN.	39 MIN.

ACCELERATION HELD CONSTANT TO ILLUSTRATE SLIGHT RETARDATION OF POLYMEL DX-40.

CURE: MIN. @ 320° F.	3			6			9			12			15		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
SHORE HDNS.	90-88	90-89	89-87	91-90	91-90	90-89	91-90	91-90	90-89	91-90	91-90	90-89	91-90	91-90	90-89
M-100	676	649	639	694	652	613	660	621	598	672	631	596	678	604	588
M-200	913	838	819	934	857	797	886	828	787	899	825	773	899	794	774
M-300	1172	1061	1020	1185	1023	987	1131	1019	977	1133	1026	964	1128	995	970
M-400			1250		1338	1235		1291	1198	1420	1263	1192		1239	1180
TENSILE	1221	1172	1356	1338	1338	1346	1248	1340	1346	1430	1340	1290	1242	1280	1340
% ELONGATION	320	350	430	350	400	410	360	408	427	405	415	420	340	415	435
% PERMANENT SET	47½	55	75	60	62½	70	47½	62½	70	62½	60	70	55	60	70
ROSS FLEX 'A' CMPD 0.6 @ 43M; 0.9 @ 91M 'B' CMPD. 0.6 @ 43 M.; 0.9 @ 84 M 'C' CMPD. 0.6 @ 66M; 0.9 @ 120M.															
AGED TESTS (24 HRS. @ 100° C. AIR OVEN)															
SHORE HDNS.	92-91	92-91	90-89	92-91	92-91	90-89	92-91	92-91	90-89	92-91	92-91	90-89	92-91	92-91	90-89
M-100	825	831	733	809	774	671	730	724	625	732	726	622	706	686	606
M-200	1103	1058	948	1063	1010	879	969	933	814	964	944	814	929	896	798
M-300			1168			1095	1218	1140	1009	1174	1170	1019	1150	1094	981
TENSILE	1202	1230	1294	1304	1240	1286	1262	1140	1176	1330	1216	1219	1150	1150	1168
% ELONGATION	235	247	340	280	260	350	320	300	357	320	320	383	300	315	370
% PERMANENT SET	30	30	57½	45	35	60	50	37½	55	55	37½	62½	35	35	55
ROSS FLEX	'A' CMPD. 0.6 @ 28M; 0.9 @ 45M										FLEX SAMPLES CURED				
	'B' CMPD. 0.6 @ 28M; 0.9 @ 35M										10 @ 320°F IN 12 IRON				
	'C' CMPD. 0.6 @ 52M; 0.9 @ 99M.										MOULD				

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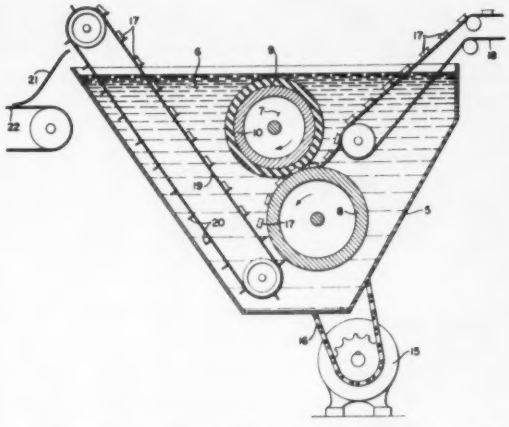
PATENT REVIEW

Finishing Molded Articles

U. S. Patent 2,908,936, issued Oct. 20, 1959, to Karl B. Kilborn and assigned to Goodyear Tire & Rubber Co., describes a method for removing overflow projections or flash from a molded elastomeric article.

As illustrated below, a tank (5) is filled with a low-temperature liquid medium (6) such as liquid carbon-dioxide. Two cylindrical rolls (7 and 8) extend through its width and are suitably journaled in its sides. The roll (7) has a resilient and yieldable cushion (9) adhered to its inner section (10). The roll (8) may be of non-resilient and rigid construction throughout, or both rolls may be of resilient material. Both are driven by external means to achieve the directional rotation indicated by the arrows.



In operation, molded heels (17) are fed to the rolls (7 and 8) by a conveyor belt (18). This belt transports the heels beneath the surface of liquid (6) and deposits them upon the roll (8). The relative rotation of the rolls (7 and 8) draws the heels between them, as the flash, now in a franzible state due to contact with the liquid, is sheared from the heels while a cushion (9) tends to envelop them. Then the heels drop to another conveyor (19) equipped with carrying lugs (20) which transport them out of the tank (5). The heels are then discharged into a chute (21). They slide down it and are deposited on a third conveyor (22) from which the finished articles may be removed.

Anti-Skid Tire

U. S. Patent 2,888,056, issued May 26, 1959 to August E. Zahlten, relates to anti-skid pneumatic tires. Various types of friction surfaces, such as spikes, extend through the casing, being retractable by the action of air-operated cylinders.

SILICONE NEWS from Dow Corning

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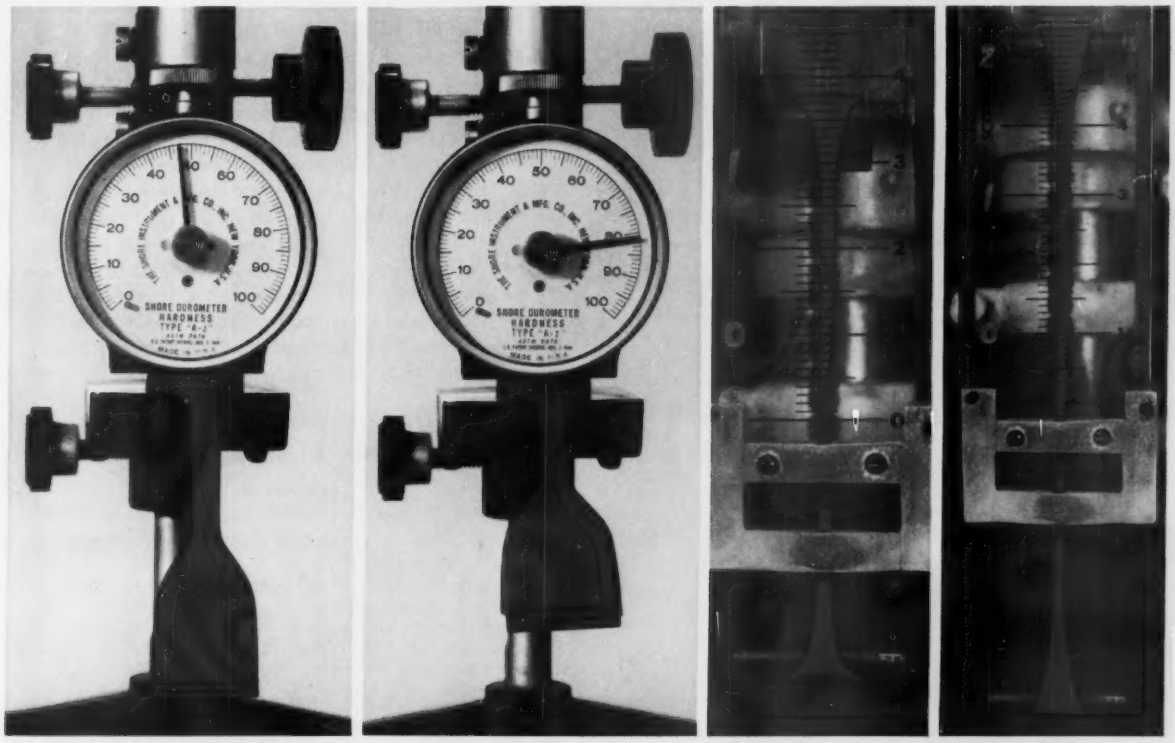

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Sample Recipes and Typical Properties

. . . For 50 Durometer Silastic	
Silastic 433 Base	100 parts
Cab-O-Sil MS-7	7 parts
Celite Super Floss	3 parts
Luperco CSF or Cadox TS-40	1.8 parts
* Durometer (Shore A)	50
Tensile strength, psi	800
Elongation, %	240
Tear Strength, lbs/in	60
. . . For 80 Durometer Silastic	
Silastic 433 Base	100 parts
Cab-O-Sil MS-7	28 parts
Luperco CSF or Cadox TS-40	1.8 parts
* Durometer (Shore A)	80
Tensile strength, psi	700
Elongation, %	150
Tear strength, lbs/in	85

* Vulcanized 5 min. at 240 F; cured 24 hours at 480 F.

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PATENT REVIEW

Polyurethane Rubbers

U. S. Patent 2,905,652, issued Sept. 22, 1959, to Chris E. Best, Walter R. Hausch, and James J. Robertson, assigned to Firestone Tire & Rubber Co., describes a method of producing polyurethane rubbers of improved properties.

It has been found that polyesters having hydroxyl numbers from 18 to 25 (instead of the usual 40-100) yield final cured products superior in tensile strength, rebound at low and high temperatures, internal friction and compression set. Furthermore, they require less diisocyanate for preparation of intermediate millable rubbery products, thus reducing over-all production cost.

Other Patents of Interest

Subject	Inventor or Assignee	Patent No.	Date
Vulcanizing apparatus	Cleveland Trust Co.	2,904,831-4	9/22/59
Vulcanizing of tires	Erhard Alm	2,904,842	9/22/59
Apparatus for testing rubber at high temperatures	Firestone Tire & Rubber Co.	2,904,993	9/22/59
Self-sealing tire	Firestone Tire & Rubber Co.	2,905,220	9/22/59
Tire valve construction	Firestone Tire & Rubber Co.	2,905,221	9/22/59
Tire chafer	Firestone Tire & Rubber Co.	2,905,222	9/22/59
Manufacturing a patterned rubber mat	Luciano Valentini	2,905,971	9/29/59
Pneumatic tires	Dunlop Tire & Rubber Corp.	2,906,314	9/29/59
Mounting for tubeless tires on vehicle wheels	Compagnie Generale des Etablissements Michelin	2,906,315	9/29/59
Manufacture of lined boots	U. S. Rubber Co.	2,907,074	10/6/59
Nonskid tire tread	U. S. Rubber Co.	2,907,365	10/6/59
Continuous vulcanization of cables	Okonite Co.	2,908,035	10/13/59
Antiskid tread for tires	Sigurd I. Olsen	2,908,312	10/13/59
Tire valve	Fred B. Pfeiffer	2,908,313	10/13/59
Spirally corrugated rubber tubing	Vance M. Kramer et al	2,909,198	10/20/59
Nonskid tire set	John T. Smith	2,909,207	10/20/59

Copies of any patents, including those described here, are available from the Commissioner of Patents, Washington 25, D. C., for 25 cents each. Do not send stamps.

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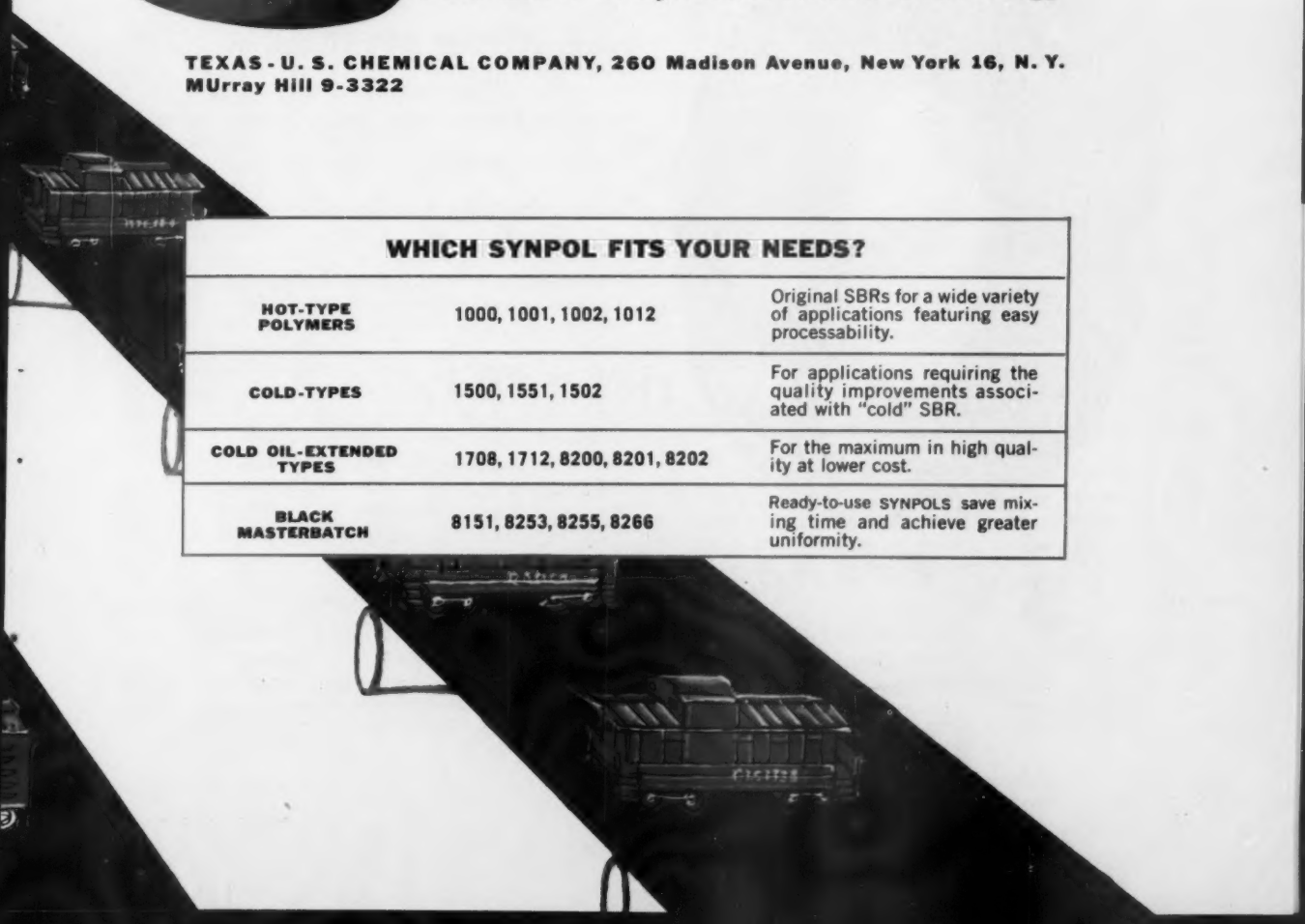

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COLD OIL-EXTENDED TYPES	1708, 1712, 8200, 8201, 8202	For the maximum in high quality at lower cost.
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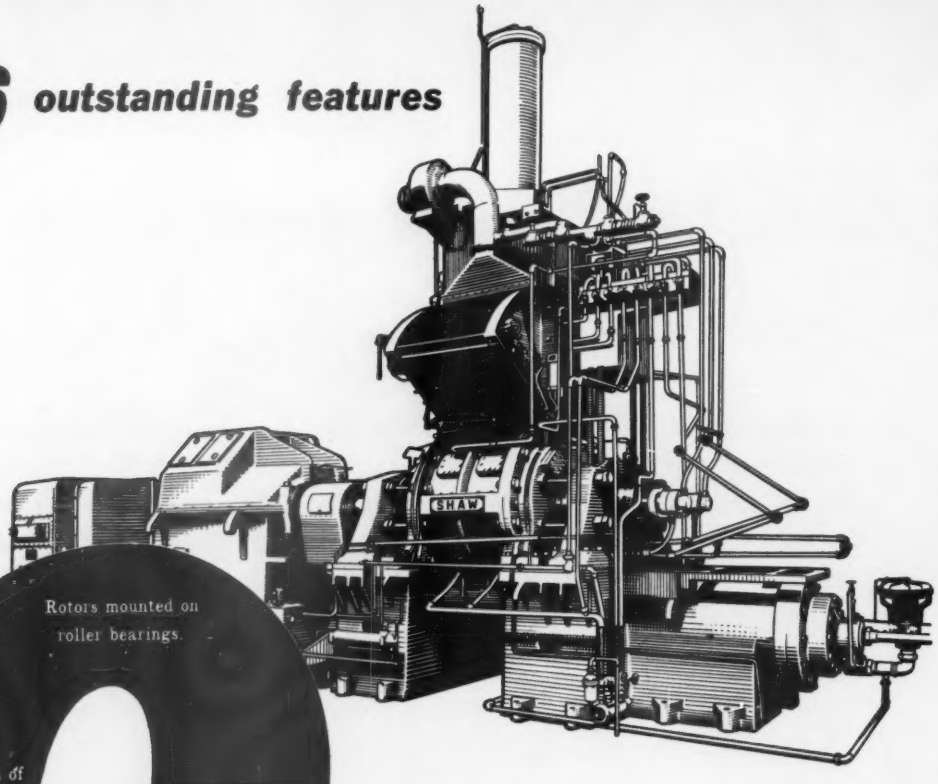

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OVERSEAS AGENTS THROUGHOUT THE WORLD

P 2801

As Ken Soule Sees It

by Kenneth J. Soule

Textile Labeling Law

On March 3, 1960, the much discussed Textile Fiber Products Identification Act became the law of the land. It applies to items produced *after* the March third date, and while it covers the majority of textiles and textile products, some articles such as furniture and mattress covers, suit and coat linings, handbags, rug pads, and hats made of cloth are exempt.

This subject has been under study for several years, and in the June, 1959, issue of RUBBER AGE, I had occasion to comment quite freely on the then-proposed legislation. In the interim, a number of the more obnoxious requirements have been eliminated and the regulation as passed appears to be quite reasonable. There is considerable question as to how much help it will actually be to the consuming public, but this remains to be seen.

In any case, the law now requires all textiles or textile products covered by the law to carry a label with the manufacturer's or vendor's trade mark, as well as the generic name of each fiber present to the extent of more than five per cent of the finished product. The same requirements apply to advertisements describing such products.

So, starting pronto, the public is going to be deluged with a barrage of jaw-breakers like modacrylic, cuprammonium, polynosic, azlon, etc., etc., as well as a host of familiar and occasionally strange-sounding trade names. We suspect that the brand names will continue to receive the same major attention that has been accorded them formerly.

In any case, the Federal Trade Commission has itself a new law, the label manufacturers have zillions of new labels to turn out, and the general public couldn't care less. "Is everybody happy?" (Actually, the answer is "No, everybody is not happy." As of March 14, 1960, two fiber producers have already sued in court [unsuccessfully] to upset F.T.C. rulings covering generic classifications of their products. Oh, well, c'est la guerre.)

One More New Car

The potential "new car" buyer today is confronted with quite a problem, considering the bewildering number of special models now available which did not exist a short time ago. Previously (assuming that the down payment hurdle had been successfully negotiated), the only question was whether to saddle yourself with an inexpensive(?), moderately priced, or plutocratish gas buggy.

Lately, however, complications have begat more complications. First, it was the small foreign car; then the American answer to the pint-sized-imports; and still later the "compact" creation, which was neither Lilliputian, nor yet full grown. And, of course, most manufacturers still continued to turn out their standard sized, garage filling Gargantuas. Pretty confusing just thinking about it—imagine what a strain it must be to make a serious study leading toward a purchase.

And, as if this were not enough, *Industrial and Engineering Chemistry* reports that electrically driven automobiles are staging a positive comeback. Twelve United States manufacturers are said to be seriously considering the production of such a car, but one actually in prototype production is at the Nu-Klea Auto Corp., Lansing, Michigan. Their model is a 2400 pound runabout, with fiber glass reinforced plastic body, and a removable top of the same material. There is no clutch or drift shaft; each of the rear wheels being propelled by an individual motor run by three conventional batteries. The total of seven batteries weighs about 900 pounds and will operate the car for approximately 60 miles before needing recharging, which can be accomplished overnight by plugging into any 115 volt 15 amp. a.c. circuit.

Other vital statistics: safe top speed, 42 miles per hour; selling price about the same as "compact American cars;" cost to operate, approximately ½ cent per mile.

While this newcomer might well appeal to anyone needing cheap around-town transportation at a sensible speed, the hot-rodders obviously wouldn't look at it even once. Again, the need to recharge the batteries every 60 miles or so could be a serious nuisance, or it might possibly lead car owners to become super-rememberers once more. If so, memory courses would surely fade and die. Let's remember to check up on this about 1963.

Fur Felt Hats

The principal material used in fabricating men's felt hats is the fur of wild rabbits, of which the chief supplier has been Australia. In the past eight or nine years, however, our friends down under have put on a high tempo campaign to kill off their over-abundant crop of wild rabbits, in order to keep the grazing areas for sheep. The drive has been eminently successful, and as a consequence, the export of Australian wild rabbit fur into this country dropped very sharply, for example, from about ten million pounds in 1951 to four million in 1958.

Ironically enough in 1959 the demand for men's felt hats in the United States took a sizeable and unexpected jump. This coupled with dwindling inventories and reduced availability of Australian fur has caused a scramble in the trade to find a way out of the dilemma. One obvious means is to use other types of fur, such as that of domestic rabbits, or of wild hares from South America or the Balkan states. In the case of tame rabbit fur, the experts claim that the color is fine but that the strength quality is lacking. Wild hare fur, on the other hand appears satisfactory but adequate supplies are questionable, especially at present prices.

Naturally, the possibility of using synthetic fibers for complete or partial replacement of Australian fur has also been seriously considered. There is no agreement in the trade as to the likelihood of success along these lines. Some manufacturers claim it is impossible, while others express mild optimism. The factor which probably poses the greatest problem is the wide difference in the character of the fibers of natural fur and any of the artificial replacements suggested. The rabbit fibers have myriads of minute branches or barbs which the synthetics lack.

In preliminary treatments of the fur, the fibers are greatly opened up, exposing more barbs, while in later operations the partially shaped hat is exposed to repeated heat, moisture, and pressure. These manipulations tend to interlock the fibers and barbs, while shrinking and compressing the felted sheet into its final form. A rubber bag is often used as a shock pressure absorber inside the sheet during much of this treatment.

Regardless of the final fiber make-up of the 1960 felt hat, one thing is sure; it is going to cost more. Still, this is very unlikely to prevent any eager candidate for office from hurling his chapeau into the ring. Politicians are funny that way!

Exit: Landmarks

By a strange coincidence, the month of February, 1960, saw the passing from the New York metropolitan area scene of two, forty-year old structural landmarks. Although they had little in common, either when in their heyday or in their demise, each stirs certain nostalgic and chaotic memories. The edifices in question were (1) the Ebbets Field baseball stadium in Brooklyn, and (2) a five-story, two-block long brick structure in Clifton, N. J., the one time home of the Passaic Cotton Mills.

As all rabid baseball fans well know, Ebbets Field was the home park of the Brooklyn Dodgers from 1913 to 1957, and was the scene of countless thrilling ball games replete with all manner of home spun drama. Now that "dem bums" have departed for greener pastures (Long-Greener, that is) it was only a question of time until the grandstands, bleachers, etc., would be torn down and new buildings built to take their place. This began on February 23, 1960, when the demolition squad started the actual destruction to make way for a scheduled housing project.

For mourning Dodgerites, however, it may be comforting to treasure the memory that about 2000 Ebbets Field grandstand seats are being salvaged, and will be installed in baseball parks being built for the use of prisoners at the New York City Workhouse on Hart's Island. (Giant rooters might make something of this).

The second structure in question was an imposing brick building on the Clifton-Passaic (N. J.) border line, which was completely destroyed in a spectacular fire on February 17, 1960. This was originally built in 1920 to take care of the rapidly expanding needs of the automotive trade for more and more cotton fabric to be built into tires. Unfortunately, for all concerned, the new venture failed to live up to the fond hopes held out for it, and after struggling along for several years the Passaic Cotton Mills finally folded up in 1927. At this late date, it is hard to pinpoint the cause of the failure, although the cheaper labor and raw materials in the competitive southern cotton mills were probably the main stumbling block.

In the following years, many concerns used portions of the building for varied operations. At the time of the final fire, the chief manufacture being undertaken was plastic printing and flocking, and it was in these machines that a stray spark lit the final funeral pyre.

It may well be that these landmarks were too old or too unimportant to have many active, or interested mourners. Nevertheless, for *auld lang syne*, may they both REST IN PEACE.

Cattails

Although these aquatic plants do not have any very close relationship to the rubber industry, they do possess an amazing combination of varied properties which may merit tabulation. As noted in an interesting article in Fisher Scientific Co.'s trade magazine, *The Laboratory*, the Syracuse University Cattail Research Center (of all things) has made an intensive study of this marshland plant, and reports commercial uses for practically all of its parts, from stem to stern.

For instance, the buried root stock (technically called the rhizome) is rich in starch, and can either be eaten like a potato, or ground into flour. The flour is high in proteins, fats and minerals, and low in water content.

The long stems and the leaves provide useful fibers and have also been used for matting, woven chair seats and caulking. The cylindrical spike or "tail," from which the plant derives its name, is recommended as a filler for seat cushions and life preservers; as feed for poultry and cattle; and as a source of cooking oil and waxes.

The cattail is somewhat similar to the bulrush in appearance and growth habits, and in fact in some reference books the names are used interchangeably. However, this is not correct and both are distinctly different plants. To further complicate the matter the bulrush in which Moses was hidden in Biblical times was still another variety, which grew abundantly along the Nile.

But to get back to the cattail; other bonuses inherent in the versatile plant: (1) its prolific growth, an acre will yield 140 tons of rhizomes; and (2) the fact that cattail flour is "an excellent source of ethyl alcohol."

Thus, when the good burghers of Morris County, N. J., rose up on their respective hind legs to protest the recent suggestion that a new jet airport be located in the area known as the Great Swamp, they were chiefly interested in protecting the privacy and peaceful happiness of their homes. However, in repelling the invasion of the raucous jets, they may have also preserved for their heirs a marshy heaven from which one day will be harvested perpetual crops of cattail treasures, bring the wealth of Croesus to Morris Co. coffers and continued serenity to suburban lives!

SILICONE NEWS from Dow Corning

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In addition, you'll find Syl-off coatings have excellent water and moisture resistance; won't migrate, transfer or contaminate. They often last as long as the paper itself, and their light weight frequently means lower costs when shipping coated paper.

For more information about Syl-off paper coatings and a complete list of approved sources of paper and paperboard made with Syl-off coatings contact any Dow Corning branch office or write Dept. 9204-a.

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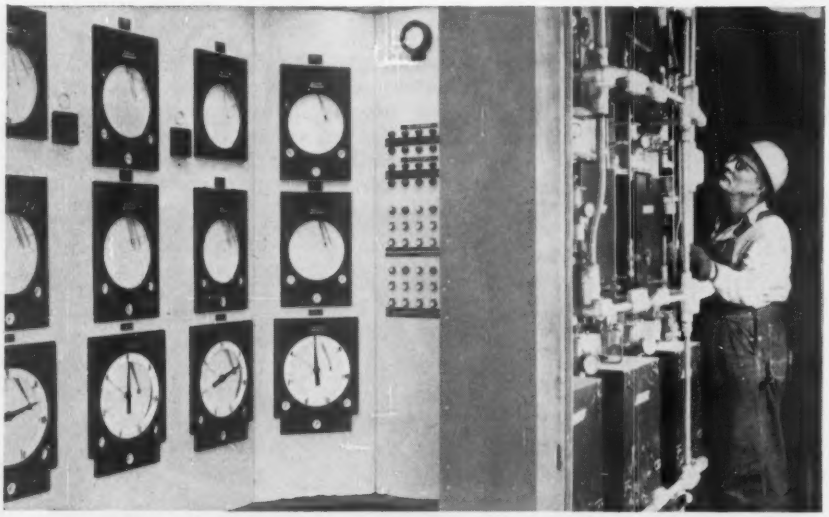
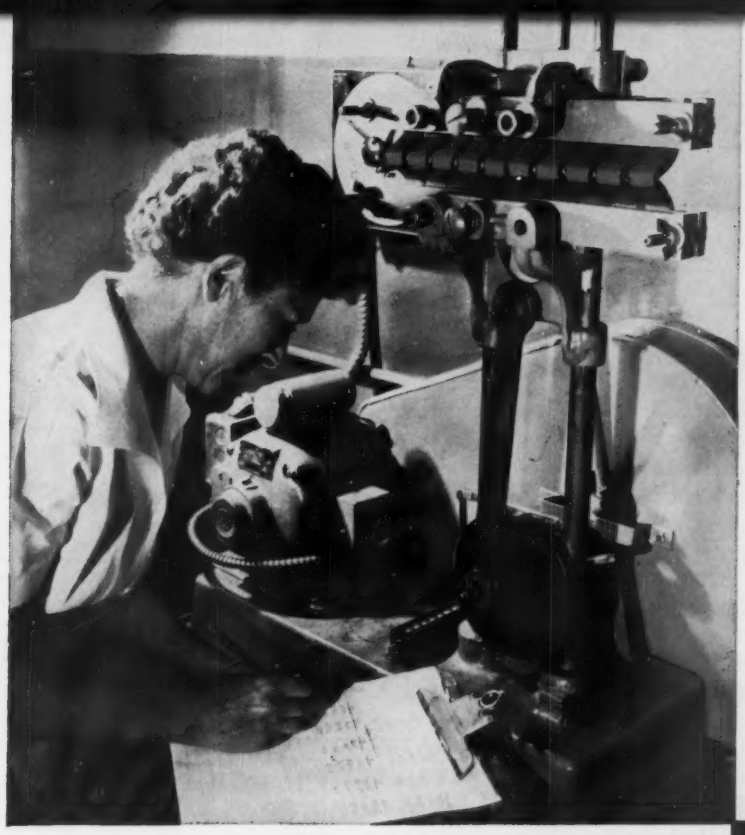


Centralized instrument panels, part of the fully instrumented production controls in use at Witco-Continental, record the continuous operating conditions in the plant. Temperature control points, recorders and automatic alarm systems evaluate and control conditions to assure a constantly uniform product. Start-up and shutdown for cleaning operations are push-button procedures.

Feed stock meters critically control hydrocarbon feed... play a vital part in the achievement of uniformity of black properties. Here, an operator conducts a routine inspection.



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capitol cues

ECONOMISTS ARE SOMEWHAT LESS OPTIMISTIC ABOUT BUSINESS now than they were a few months ago. This doesn't mean that they are looking for serious trouble or an early recession. Quite the contrary--they still believe that business will expand and new records will be set. But they don't feel that gains will be as large as originally anticipated. Why? Two reasons: The January stock-market break has raised doubts about an early leveling out. And business has cut bank borrowing--which may mean less inventory buying.

Behind these warning signs, the experts note these factors:
-Inventory rebuilding hasn't been as great as expected after the end of the steel strike. The strike didn't reduce them as much as was believed and they were high at the year-end.
-Sales of new cars are falling short of expectations, despite good Winter sales; stocks are piling up and production rates are being trimmed. So, near-record forecasts may not be met.
All of this is vitally important, because inventory-buying and sales of autos were counted on heavily to lift business.

Here is what analysts in government and industry now think:
-Inventories, which were expected to rise in the first quarter at an annual rate of $10 billion, now may rise only at a rate of $8 billion or so. Next quarter, the rate may be cut more.
-Steel output looked as if it would hold at 90% through June until very recently. Now production may be cut much sooner.
-Auto sales had been expected to hit 7.2 million during 1960. But the talk in Detroit now is of 6.8 to 7.0 million units. But, this still would make 1960 one of the best years ever.
-Business spending for new plant and equipment may not show more than a 10% gain over 1959; 15% had been the forecast.
For the economy as a whole, the experts now are anticipating rises only one-half to two-thirds as much as first predicted.

OFFICIALS IN WASHINGTON AREN'T WORRIED ABOUT A SLOWING in business. Many think it will be a good thing for the country and for most Americans. For one thing, a sharp rise brings with it the danger of a sharp recession. So, a slower upturn holds promise of a longer period of high-level activity. What's more, many of the experts feel business and the stock market should have a period of sobering up, so there will be fewer speculative excesses.

This sobering may also have a healthy effect, longer term, if it serves to puncture the over-optimistic forecasts for the Golden Sixties that are now prevalent. U.S. officials hope so, anyway; they are still worried about inflation.

The U.S. economy is still vulnerable to recession. Total government spending, which stimulates or depresses business, can fluctuate from year to year. Instalment credit is at an unusually high level. And stock market prices can be bid up with money borrowed indirectly. So officials want caution.

capitol cues (cont'd)

SMALL COMPANIES INTERESTED IN ENTERING FOREIGN TRADE will receive help from two U.S. agencies--the Small Business Administration and the Department of Commerce. SBA is planning meetings all over the country this year to tell businessmen about world commerce opportunities. The Commerce Department will assemble data from trade missions in many countries; SBA will distribute it.

THE PRODUCTIVITY OF U.S. FACTORY WORKERS IS RISING RAPIDLY these days. For 1960 as a whole, the gains will be substantial, extending those of last year. (In 1959, despite the big strike, output per man-hour in manufacturing rose 7%--largely in the first half.) With wage rates moving up less rapidly than in past expansions, this indicates that business probably can increase its profits this year--even though there'll be less pressure to raise prices.

> For production workers alone--excluding office, sales, and other help--government figures show productivity gains last year were less than those for all workers. Relatively few nonproduction workers have been added to work forces to handle the big output rise of the recovery. In durables, production worker output per man-hour rose 5½%; the increase was only 2% in the nondurables.
>
> The gains in productivity this year will be big, though probably not as great as in December and January, the catch-up period at the end of the steel strike. For 1960 as a whole, you may see gains of 6% or so. But a downturn in business activity later in the year could easily bring a much lower productivity rise.

LABOR'S NEWEST BARGAINING GOAL IS THE AGENCY SHOP, which provides for payment of a "service charge," equivalent to union dues, by nonunion workers. The new steel contract, which set up an agency shop for the first time in that industry, has touched off the drive. Big advantages for the unions is that the agency shop is legal in some states where "right-to-work" laws bar union shops.

COLLECTION OF STATE TAXES ON INTERSTATE BUSINESS is being stepped up by several states--and more are expected to launch collection drives later in 1960. (This is the tax the states are levying on apportioned shares of the profits a firm derives from business within a "foreign" state's borders.) A law by Congress exempted some--but far from all--types of business from this type of state taxation. Some businessmen are reportedly waiting till states bill them; however, this could mean some added expenses in interest and in penalties. Georgia and Louisiana are especially active in collection drives. Nearly 30 states now have laws on the books for taxing interstate profits.

THE DEMOCRATS WILL GET HALF OF THEIR PROGRAM through Congress this year. That's the view of political observers in assessing the chances for the program laid out recently by Senate Majority Leader Johnson and other party chieftains. The Democrats probably will be able to carry out their plan to cut $2 billion or so from Ike's Budget, mainly in foreign aid. Johnson also will be able to push through a big housing bill, a hike in the minimum wage, bigger benefits to social security recipients, a civil rights plan, and more funds for space work.

> It is hard to see where the Democrats will get the strength they would need to pass their bills for hospital care for the aged, a new farm program, aid to education, more money for public works, and more appropriations for the military.

Newest best seller...soles of Ameripol Rubber

To rubber soling's well known virtues of durability and economy you can now add another advantage—exceptional appearance and smooth feel. As a result, this new product of Bearfoot Sole Company is enjoying spectacular sales in the quality, dress shoe market.

The new look is achieved by the use of advanced finishing techniques with a new rubber polymer—Ameripol 4600. Since the process demands that only a minimum of pigment may be used, the uniformity of color and texture must be inherent in the rubber raw material. Ameripol 4600 consistently meets the stringent requirements—and cuts processing costs in the bargain.

If you make or use rubber products, it's wise to check Goodrich-Gulf. We produce the broadest range of polymers in the industry, and stress the individual technical services that can help *you* make improvements. Contact Goodrich-Gulf Chemicals, Inc., 1717 East Ninth Street, Cleveland 14, Ohio.

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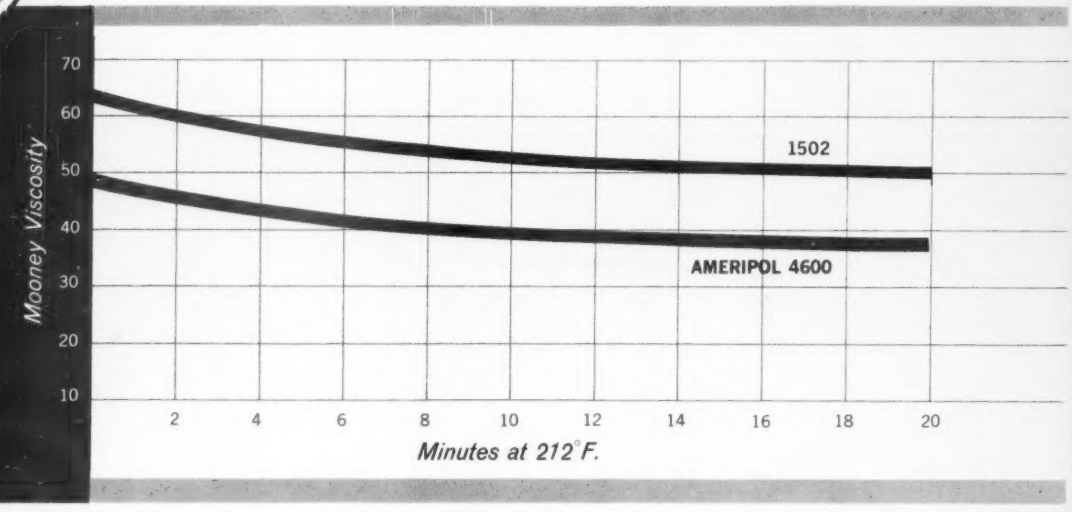
CUT YOUR PROCESSING COSTS WITH NEW AMERIPOL 4600

shorter breakdown - faster cure - with new low Mooney polymer

MOONEY BREAKDOWN CURVES

Samples not premilled



Time is money—and Ameripol 4600 is a new Styrene-Butadiene Rubber specifically designed to reduce the fabricator's processing time.

Ameripol 4600 reduces breakdown time by virtue of its significantly lower viscosity—in the 36-48 Mooney range. Time is saved in the mixing cycle, power requirements are reduced, extra wear and tear on machinery eliminated.

Ameripol 4600 is lighter in color than 1502 type polymers and is ideal for white or light colored products, such as shoe soles, floor tile, sponge, white sidewalls, sport shoes and household goods. And the reduction in processing time helps you control color.

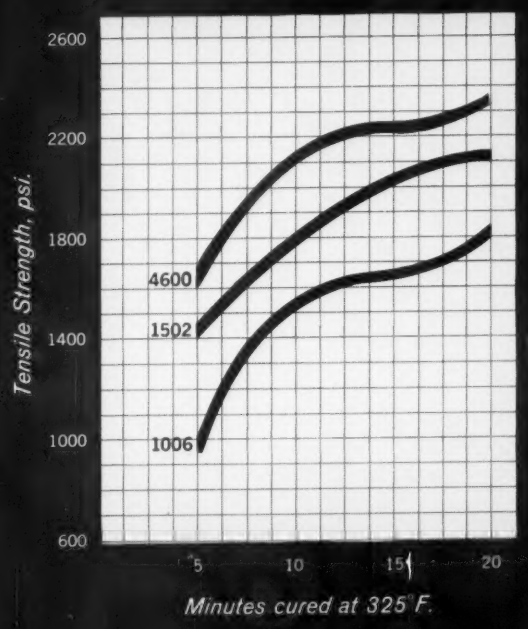
TEST RECIPE

SBR 1502	100		
Ameripol 4600		100	
SBR 1006			100
Zinc Oxide (lead free)	3	3	3
Hydrated Silica	30	30	30
Diethylene Glycol	2	2	2
Dicumyl Peroxide	1	1	1
Raw ML4, 212°F.	55.5	36	54.5
Compd. ML4, 212°F.	76	64	74.5

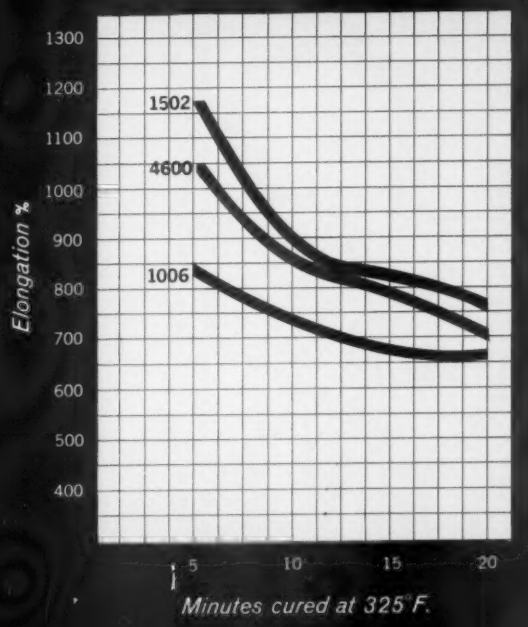
Good physical properties—Tests made in the Goodrich-Gulf Sales Service Laboratory compare physical properties of Ameripol 4600 with 1502 (a standard, non-staining cold polymer) and with 1006 (a standard, non-staining hot polymer) in a typical crepe soling recipe. These tests indicate that you can make production cost savings with Ameripol 4600 while maintaining good quality products.

Ameripol
THE PREFERRED RUBBER

Good physical properties offered by ***Ameripol 4600***

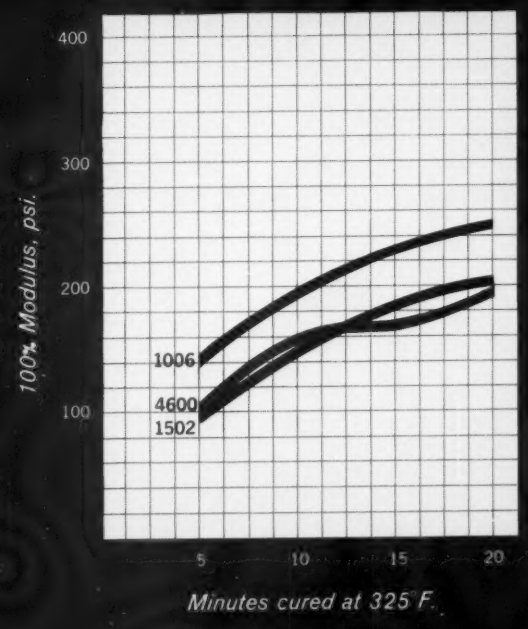


TENSILE STRENGTH

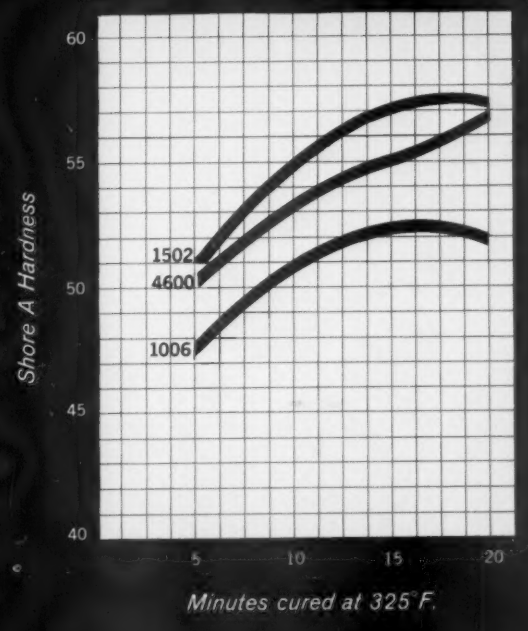


ELONGATION

MODULUS



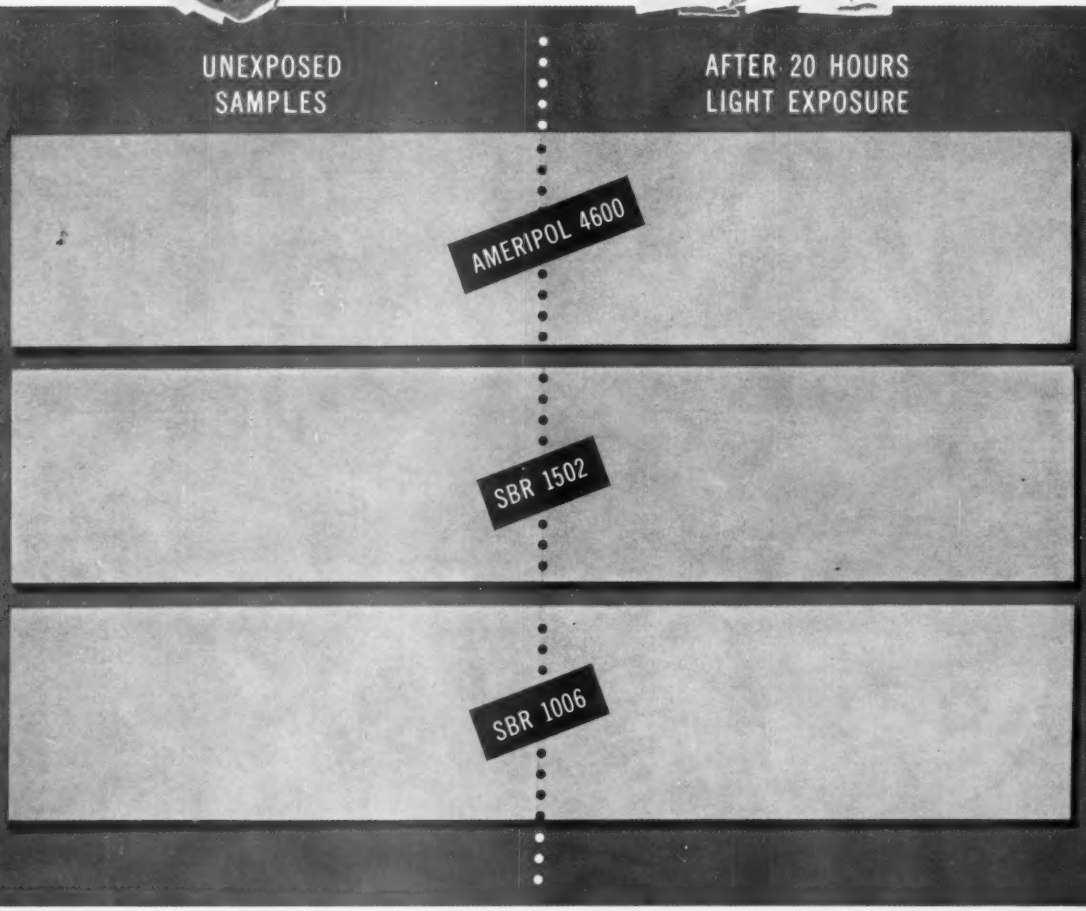
HARDNESS



Goodrich-Gulf Chemicals, Inc.

AMERIPOL 4600

is lighter, has superior color stability



These samples are all compounded to the same recipe and the exposure tests were made with 20 hours of S-1 lamp. The superior color stability of Ameripol 4600 is another advantage worth investigating. Check your Goodrich-Gulf representative for information, or send for 4600 Technical Data Sheet. Write Goodrich-Gulf Chemicals, Inc., 1717 East Ninth Street, Cleveland 14, Ohio.

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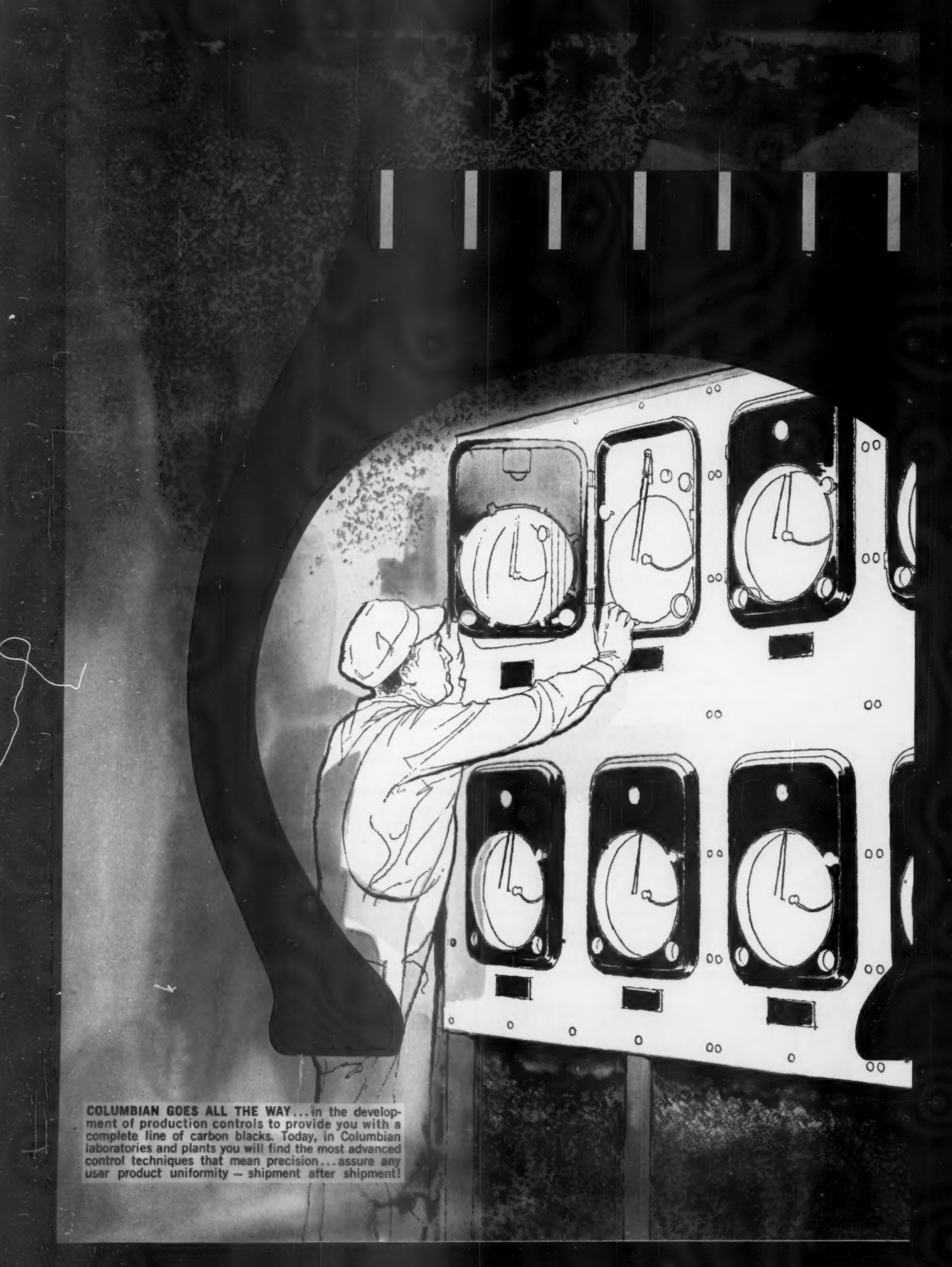

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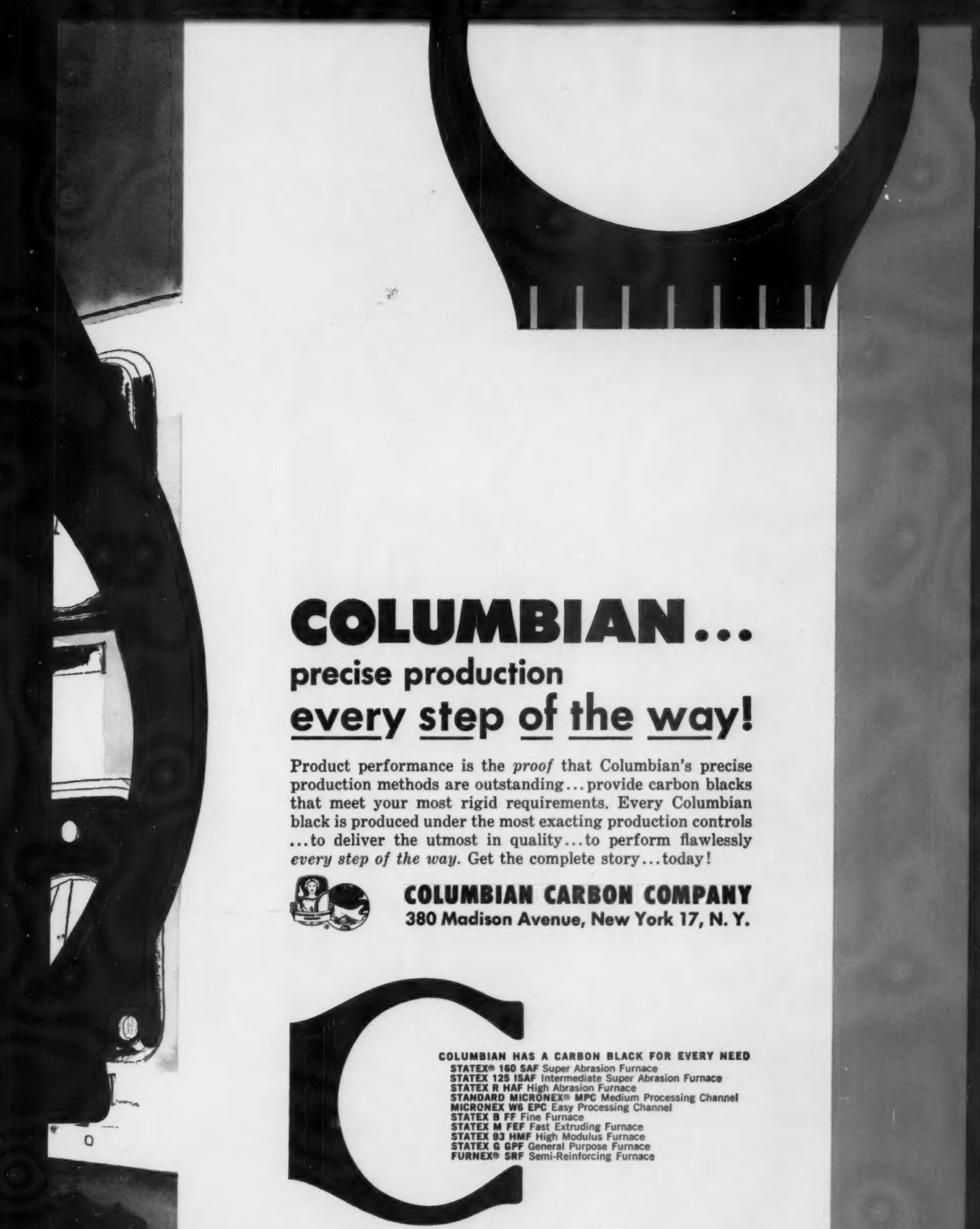

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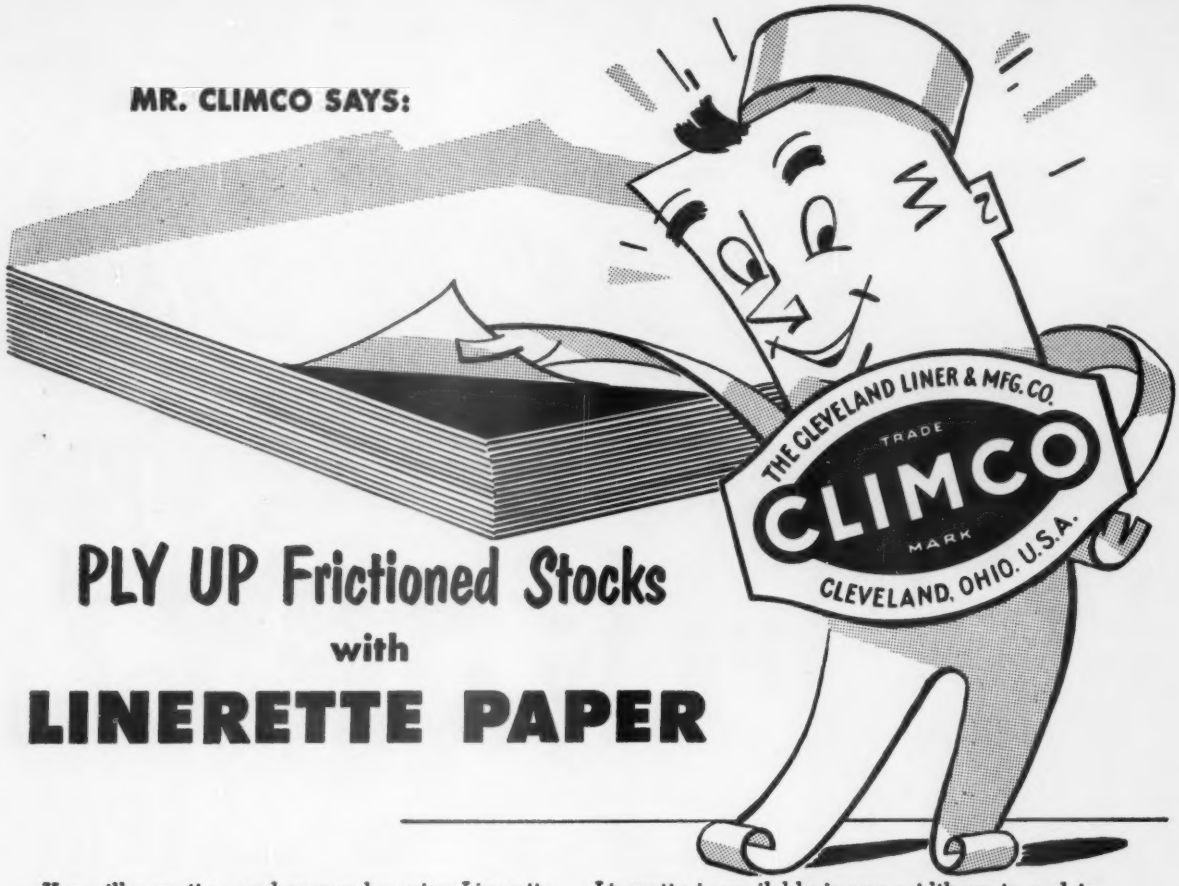

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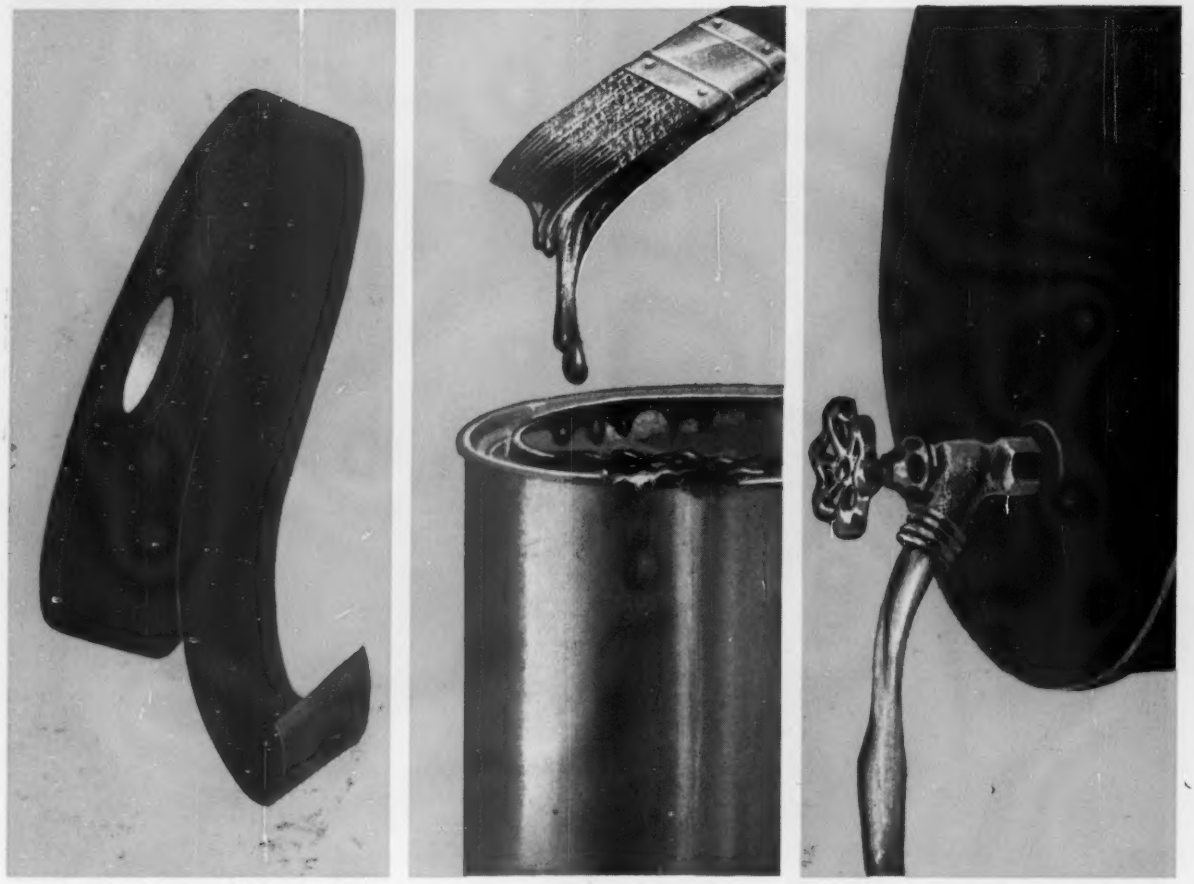
Naugatuck RECLAIM



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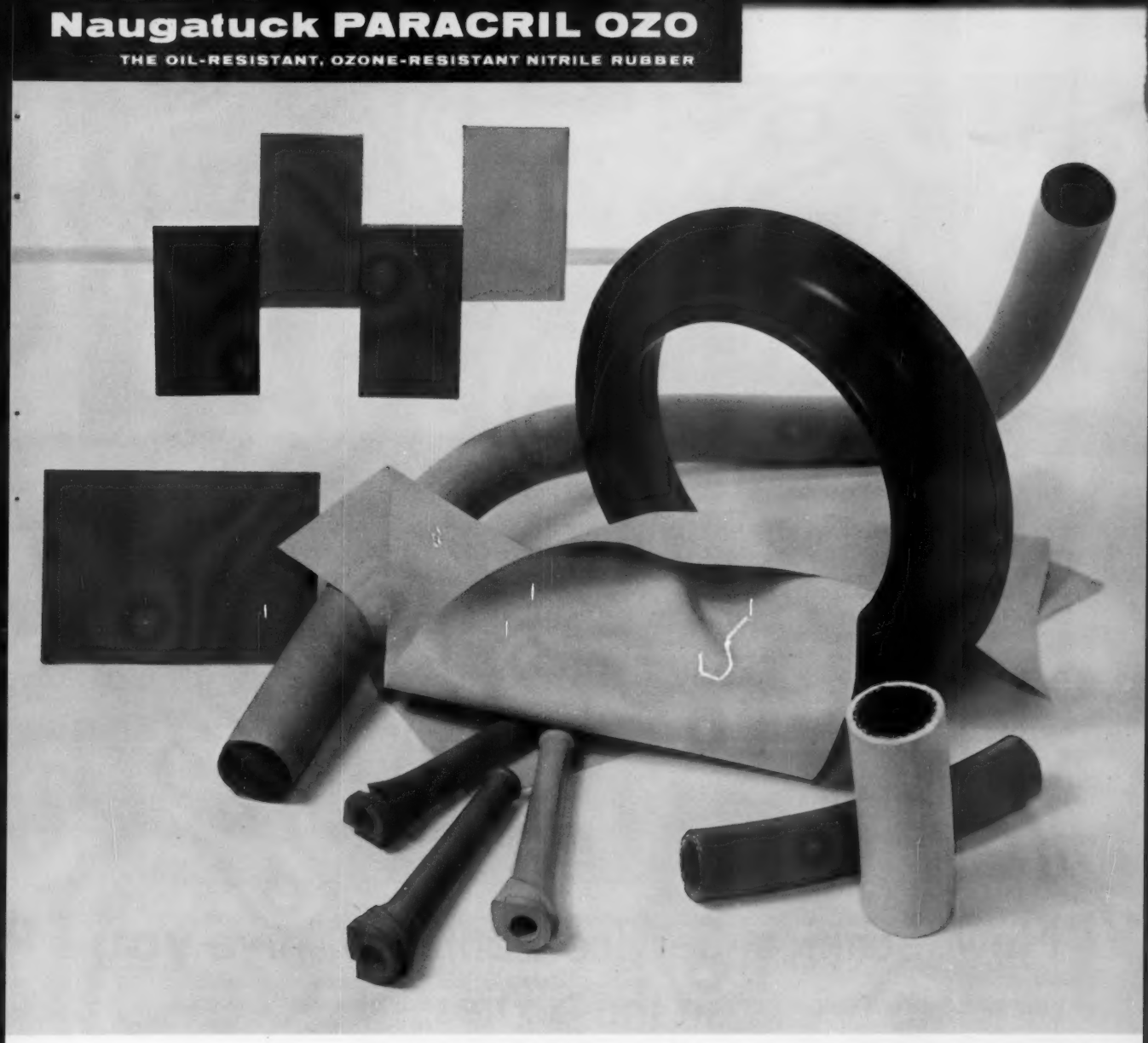

...tough, oil-proof, weather-proof and **colorful, too!**

The samples above should begin to give you some idea of the endless color possibilities in ozone-resistant rubber products made of new PARACRIL® OZO. Now you can give your product color that *sells*... color that identifies for coding wire and cable jacketing... color that blends or *contrasts*... color that works in a hundred ways. And you can give your product other superior properties, too.

Along with color, new weather-resistant PARACRIL OZO gives you a combination of high abrasion resistance, oil resistance, flex life and other valuable rubber properties far surpassing conventional weather-resistant rubbers.

Cast a new eye on the rubber product you make or buy. See the difference color makes. See your Naugatuck Chemical Representative or write the address below for full information on PARACRIL OZO and the advantages it offers.

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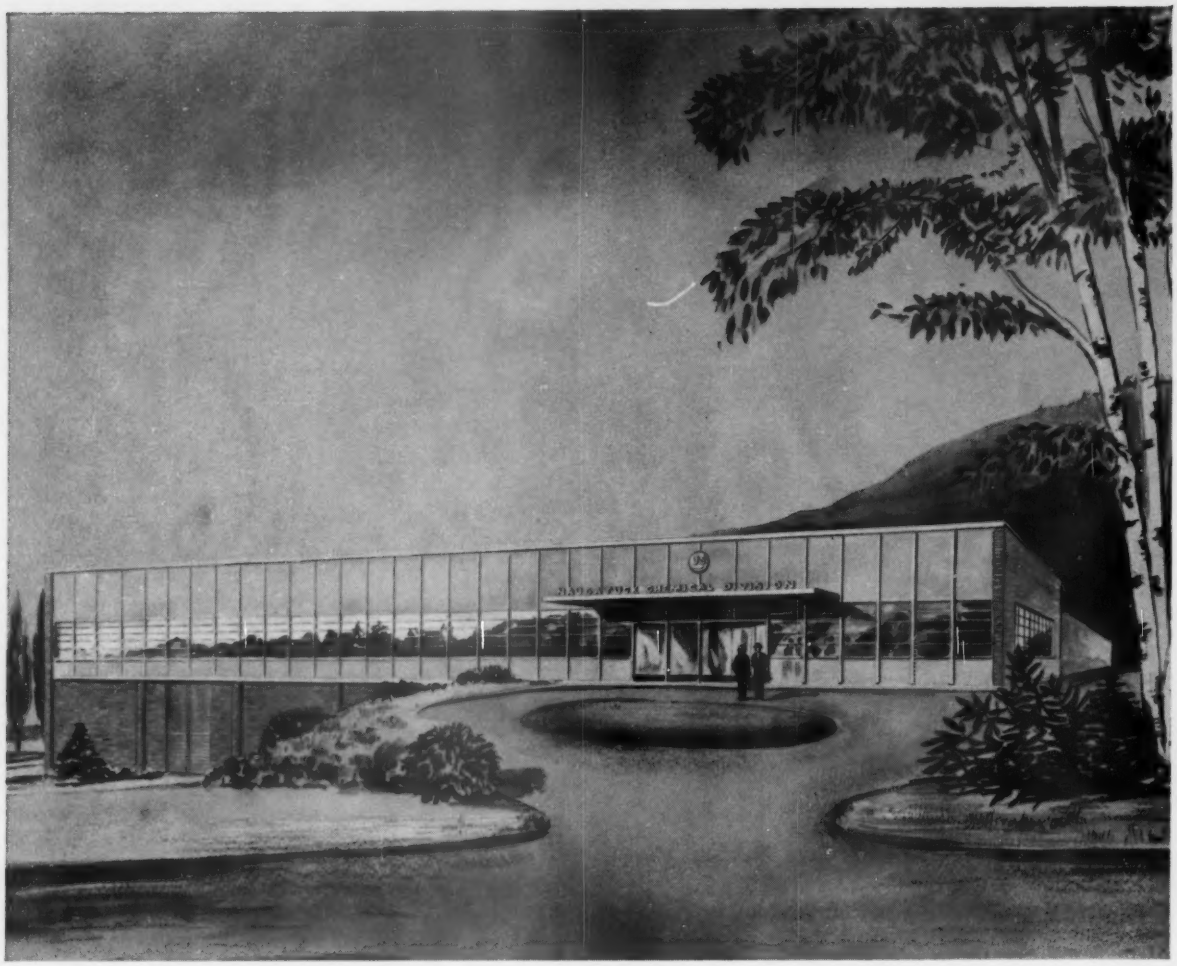

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Radiation Resistance of Polysiloxane Elastomers

By D. J. FISCHER, R. G. CHAFFEE and VERNON FLEGEL

Dow Corning Corporation, Midland, Mich.

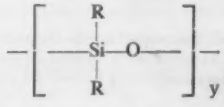
THE application of nuclear reactions has brought forth requirements for new rubberlike materials. These materials are needed in the processes for enriching radioactive fuels, in nuclear power plants operating critically and in control of radioactive waste material.

The critical need for such materials initiated extensive testing programs on existing elastomers. Evaluation of the data led to classifications which showed some elastomers to be better than others. Tests on a few members of a family of materials frequently resulted in the generalization that all of that family were or were not radiation resistant. Such was the case in 1956, when silicone elastomers as a class were considered inferior to all other classes except the fluorocarbons and butyl *(1)*.

It is not the purpose of this paper to compare silicones with other materials, but to demonstrate the radiation resistance that can be obtained with them. Originally, silicones were designed to satisfy high-temperature requirements. Now recent modifications allow their use in the combined environments of high temperature and radiation.

Special Properties of Silicones

A silicone may be defined as "a compound containing the elements silicon and oxygen and organic groups, the silicon being in sufficient amount to affect the properties measurably" *(2)*. Linear silicone polymers are the special case of a one-dimensional network containing alternating silicon and oxygen atoms. They can take on a variety of physical forms depending on their molecular weight and the actual substitution of the R group.



Prior work by Zack, Warrick and Knoll *(3)* on low molecular weight fluids and Fischer, Zack and Warrick *(4)* on silicone greases has pointed out the great versatility of silicones as a class of materials for radiation environment applications.

The initial work by Charlesby *(5)*, Warrick *(6)*, et al showed that, in radiation environments, high-molecular weight dimethyl polysiloxane fluids had a great tendency to gel, while elastomers gave reactions which greatly reduced their elongation. These results were due to the R group's being aliphatic. Aliphatic groups are very susceptible to degradation or chemical reaction when subjected to high ionizing radiation.

A New Series of Polymers

. . . HAS BEEN DEVELOPED to offer maximum protection against the harmful effect of radiation. A recently completed series of experiments reveals the superior performance of these materials under beta and gamma ray bombardment.

While further research remains to be done, formulations already tested have shown 25 times more radiation resistance than previous compounds. Specific fillers and antirad additives offer an even greater degree of protection. The resultant silicones retain their initial ability to withstand high temperatures.

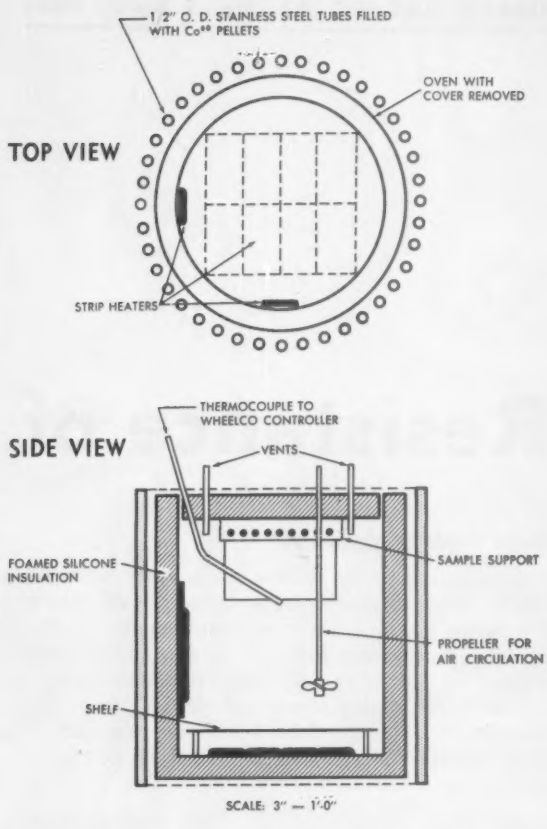


FIG. 1—Two views of the experimental apparatus are shown in cross section above. Samples were heated in an oven surrounded by cylinders containing Cobalt-60 pellets.

G values for gas evolution (number of molecules reacted per 100 electron volts) and electron spin resonance studies *(3)* along with an analysis of modulus changes in radiation environments *(7)* showed that the predominating reaction was one of cross-linking and not chain scission. The -Si-O- backbone was acting like a transparent material for ionizing radiation. These results indicated that the aliphatic group had to be replaced by one that is more radiation resistant, before the radiation stability of the siloxane backbone could be utilized. This paper is devoted to showing how substitution of the R group in polysiloxanes can give greater radiation resistance. More specifically, within the broad class of versatile silicone materials a new series of polymers exists with greatly improved radiation resistance.

These polymers give 10 to 23 times more radiation resistance, based on dose required to reduce elongation to 50 per cent, than polydimethyl siloxane in a simultaneous environment of 200° C. and radiation. They also have additional advantages in that they can utilize special fillers and antirads (additives which reduce radiation effects) for even better radiation resistance.

Setting Up Experimental Apparatus

A nominally 18 kilocurie Cobalt-60 source of the Dow Chemical Company was used for studying gamma radiation effects. Cylindrical stainless steel capsules which enclosed Cobalt-60 pellets were arranged in a cylinder (Figure 1). The intensity profiles inside the cylinder were determined in order that exact doses could be calculated. The radiation dosimetry followed the exact specifications of ASTM D-1671-59T. A maximum error of 5 per cent was estimated from the calibration studies.

An oven was designed so that it could be mounted inside the cylinder of rods. The air in this oven was circulated to maintain an even temperature distribution. The temperature was controlled by a Wheelco unit which gave a maximum variation of 5° C. Each elastomer sample was suspended in the oven by a perforated aluminum foil holder.

Accelerated electron irradiations were conducted with a 2 mev Van de Graaff using 250 microamperes beam current. The samples were placed on rims of two bicycle wheels which were placed adjacent to each other under the electron beam. Localized sample temperatures of 165° C. were indicated under the beam, while the remainder of the wheel's motion allowed the samples to cool.

The initial physical properties of the elastomers had the following ranges:

Tensile based on the initial cross-section	800 to 1200 psi
Per cent elongation	100 to 400

All samples which had been treated with radiation and the simultaneous environment of high temperature and radiation were removed from the source, cooled immediately, then tested later at room temperature.

Testing and Evaluation

An exact knowledge of the experimental procedure and details is not necessary for interpreting the effects discussed in this paper. The important point is that the procedure was not varied for different samples, so that each differential effect would have true significance. Care was taken to ensure uniform testing in order that new variables would not be introduced.

Tensile strength is not a critical physical property of polysiloxane elastomers when treated with radiation since a decrease in tensile is observed only after an extreme dose. This is not true for per cent elongation, which decreases quite rapidly, making a change in its value a sensitive measure of radiation resistance.

Initial vulcanization and cures give a range of per cent elongation values. Furthermore, the actual value will vary from one elastomer to the other, which makes comparisons based on retention of initial elongations unreliable. In order to evaluate material independent of initial elongations, each sample was treated with radiation until its elongation was reduced to an absolute value of 50 per cent. The dose necessary to

cause this degree of degradation was used for comparing different effects.

The initial degree of cross-linking does have a slight effect on the evaluation dose. This effect was found to be negligible when compared with the effects of composition of polymer, filler and antirad.

Measuring Radiation Resistance

Polydimethyl siloxanes have an appreciable aliphatic character. It is this characteristic which causes them to cross-link readily in a radiation field. One way of quantitatively expressing their aliphatic character is to calculate its electron fraction *(8)*. Zack, Warrick and Knoll *(3)* have applied this concept to studies on the radiation resistance of siloxane molecules, defining the electron fraction aliphatic as the total number of electrons associated with aliphatic groups divided by the total number of electrons in the entire molecule.

The inherent radiation resistance of the new polysiloxane systems is illustrated in Figure 2. As the electron fraction aliphatic is reduced, radiation resistance increases. Polymers with electron fraction aliphatic of 0.126 and smaller comprise the radiation resistant polymer series. These evaluations were conducted at 200° C.

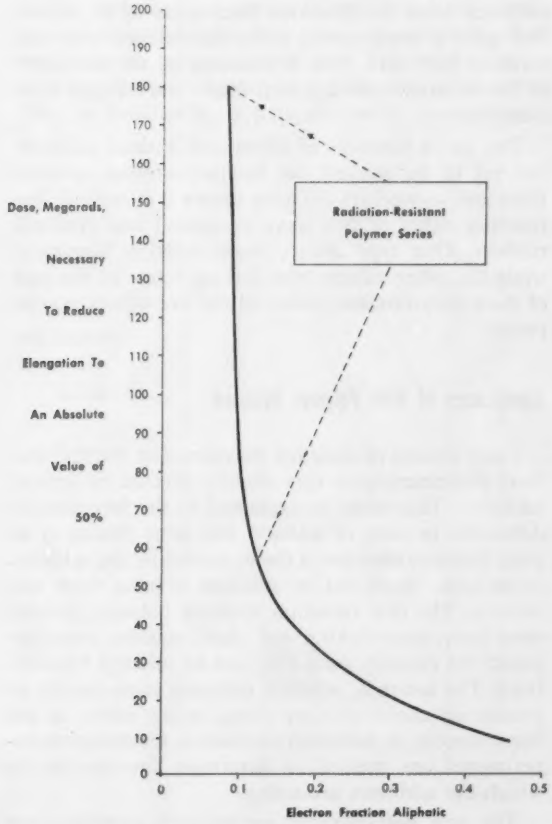

Dose, Megarads, Necessary To Reduce Elongation To An Absolute Value of 50%
Radiation-Resistant Polymer Series
Electron Fraction Aliphatic

FIG. 2—Results of testing siloxane polymers in a simultaneous environment of 200° C. and gamma radiation, at a rate of 0.4 megarads per hour.

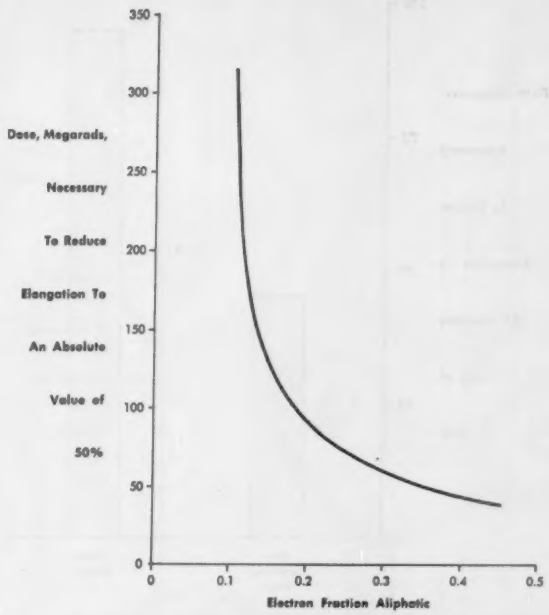


FIG. 3—Curve represents data from experiments on siloxane polymers in an accelerated electron environment at an estimated temperature of 165° C.

The only formulation variable that exists within this series of vulcanizates is that of the polymer. Consider the best elastomer tested thus far in this series: Based on the dose necessary to reduce the original elongation to 50 per cent, it is 23 times more radiation resistant than the polydimethyl siloxanes which are on the extreme right of the curve.

The elastomer represented by the highest point on the curve has an evaluation dose of 180 megarads for this 200° C. irradiation. Similar evaluations on this elastomer for room temperature irradiations have not been completed. However, data on the first member of this series of radiation resistant elastomers (electron fraction aliphatic, 0.126) have been obtained and its resistance value found to be 600 megarads. Therefore, room temperature evaluation doses greater than 600 megarads can be expected with elastomers whose electron fraction aliphatic is less than 0.126.

Beta Ray Comparisons

This same series of elastomers was treated with Van de Graaff irradiations in order to see whether the same basic radiation resistance would be effective in beta ray environments. The results plotted in Figure 3 show that the same basic law which governs radiation degradation with gamma rays also covers accelerated electrons. The actual dose evaluations in this case are somewhat less than those obtained with room temperature irradiations, but greater than those obtained with 200° C. treatment. They approximate what was expected for 165° C. irradiations.

One of the first polymers in the radiation resistant series (electron fraction aliphatic, 0.126) was selected

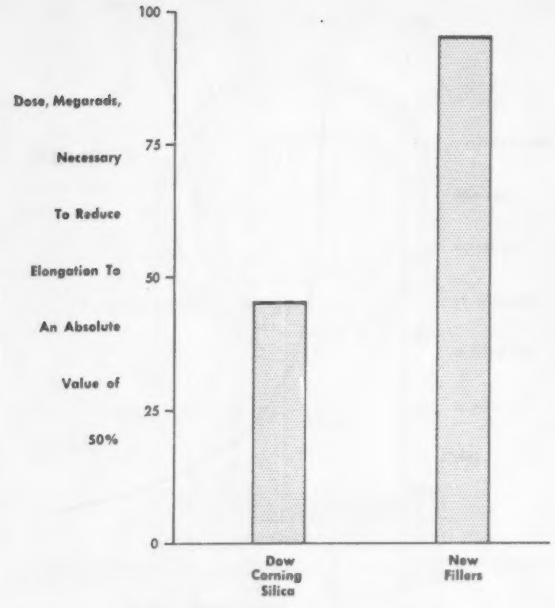


FIG. 4—Marked increase in radiation resistance was shown when new fillers were added to a polymer with electron fraction aliphatic 0.126, in a simultaneous environment of 200° C. and gamma radiation.

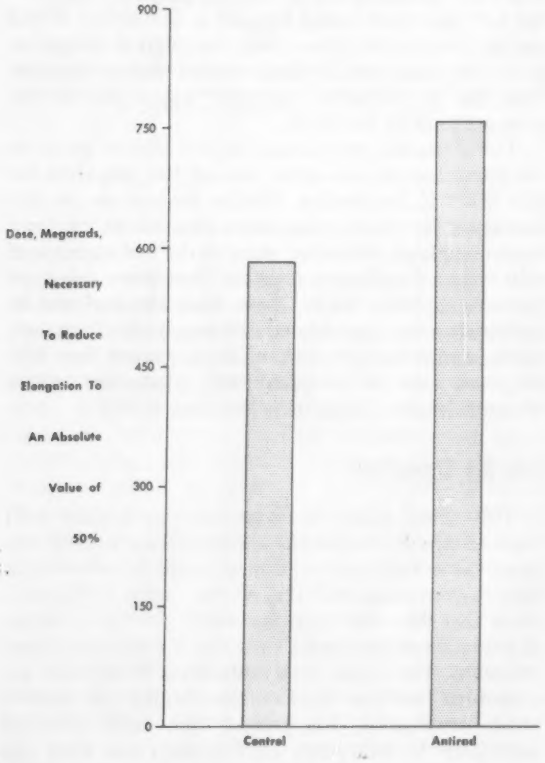


FIG. 5—Only 40 per cent improvement was noted when protective effects of antirad additives were tested during irradiations at 25° C. temperatures.

for a study of special fillers. Figure 4 shows that radiation resistance can be increased 100 per cent with the new proprietary fillers.

Antirad investigations have not yet been completed for the best elastomer formulations. However, the effect of antirad-type additives in 25° and 200° C. radiation environments can be seen on the same first polymer in the radiation resistant series. The bar graph of Figure 5 shows that a 40 per cent improvement was experienced during 25° C. irradiations. Figure 6 shows that a 260 per cent improvement was obtained in the 200° C. irradiation evaluations. These data indicate that antirads probably will be more useful during high-temperature irradiations. Additives in somewhat more complex formulations, especially those having lower electron fraction aliphatic, have given 250 megarad evaluation doses during 200° C. irradiations.

Equal Cross-Linking Is the Optimum

Replacing aliphatic groups by more radiation stable species during synthesis of polysiloxanes gives increased radiation resistance. This increased resistance is the result of decreasing the rate of cross-linking. An optimum situation will exist when the cross-linking rate becomes equal to the chain scission rate. Indirect evidence from the previous data leads us to believe that such a condition is being approached with this series of polymers. This is indicated by the sensitivity of the elastomers to different fillers and antirad additives.

The exact function of fillers and antirad additives has yet to be worked out for polysiloxane systems. Born and co-workers *(9)* have shown that antirads can function either of two ways in natural and synthetic rubbers. One type affects chain scission frequency, while the other affects cross-linking rates. In the case of these polysiloxanes, either of the two effects may be present.

Significance of New Polymer Systems

Early studies of dimethyl polysiloxanes showed that their elastomers were very slightly affected by antirad additives. This could be explained by the fact that the difference in rates of scission and cross-linking is so great that any changes in them, caused by the addition of antirads, would not be sufficient to bring them into balance. The new radiation resistant polymer systems must have cross-linking and chain scission rates approaching equality since they can be affected by additives. The antirads, whether reducing cross-linking or increasing chain scission rates, bring about a net improvement in radiation resistance. Quantitative experiments are needed to determine the manner in which the additives are acting.

The new polysiloxanes are research materials, not commercially available at present. In order to gauge the exact contribution they will make as future com-

mercial materials, they were compared with polydimethylvinyl siloxanes and the highest phenyl-containing polysiloxane systems which were commercially available (Figure 7). The initial elongation of dimethylmethylvinyl siloxane elastomers is reduced to 50 per cent after 9 megarad exposure at 200° C. Similar degradation is shown by the high-phenyl commercial polysiloxanes after 29 megarads, while the best radiation resistant research material at this time withstands 250 megarads.

Present Versatility and Future Promise

The first polysiloxanes that were tested in radiation environments were not designed to be radiation resistant. Furthermore, attempts to improve these materials by incorporation of special antirads and fillers yielded little if any improvement. Now the first series of polysiloxanes designed to be radiation resistant has been studied in simultaneous environments of 200° C. and radiation.

Initally radiation resistant, this new series of polymers offers the opportunity for increasing resistance through the use of special fillers and antirads. Experimentation is not complete on the final members of this polymers series. However, elastomer formulations exist which are 25 times more radiation resistant than the original polydimethyl siloxane system.

The polysiloxane compositions discussed in this paper are part of the first phase of materials which contribute to radiation resistance. This work is given in evidence that silicones as a class offer great versatility for functioning in new and future environments.

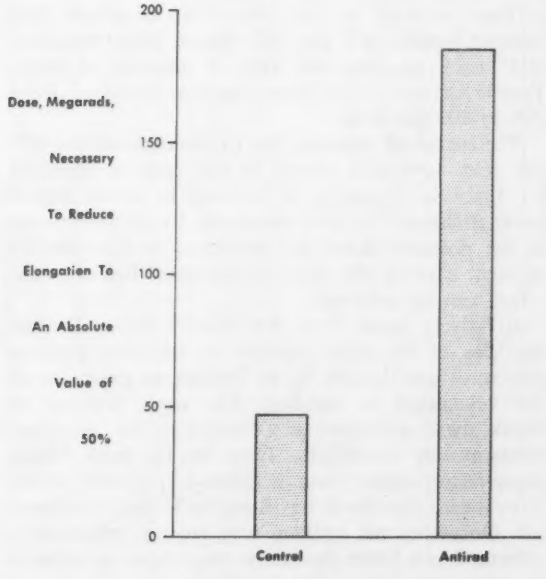


FIG. 6—Antirad effect is much more pronounced at high temperatures. These data reveal a 260 per cent improvement for irradiations at 200° C.

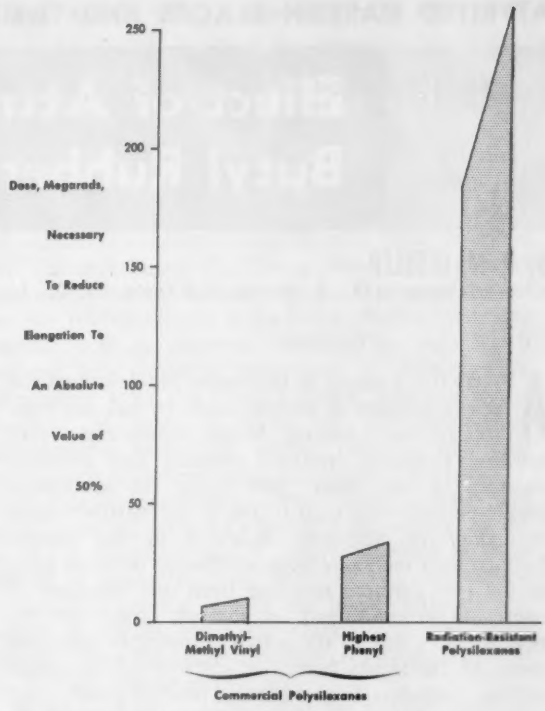


FIG. 7—This graph compares the radiation resistance of commercially available polysiloxanes with that of the new polymers, using simultaneous environments of 200° C. and gamma radiation.

ACKNOWLEDGEMENT

The authors wish to express their thanks to Dr. E. L. Warrick (Dow Corning Corp.) and Dr. David Harmer (Dow Chemical Co.) for their assistance as consultants in radiation technology. We are also indebted to various members of The Dow Corning Corporation research staff for their syntheses of these new polymers.

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ATTRITED CARBON BLACKS AND THEIR BEHAVIOR IN ELASTOMERS

PART 2 Effect of Attrited Blacks on Butyl Rubber Properties

By A. M. GESSLER
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A PREVIOUS paper in this series *(1)* described the severe attrition of carbon blacks by ball and two-roll (rubber) milling. It was shown that severe attrition produces profound physical and chemical changes in the black. Stiff paste oil absorption measurements were used to follow the destruction of secondary or aggregate structure in the blacks. Surface area increases were attributed, in small part, to the new surfaces resulting from this breakage of aggregate structure and, in a much larger part, to new surfaces due to the actual chipping or abrading away of fragments from the surfaces of individual carbon particles. Free radicals, produced either by the mechanical cleavage of carbon-carbon bonds in these fractures, or made available by the exposure or uncovering of unpaired electrons originally present in the interior of the black particle, were held responsible for the surprisingly large increases in oxygen content which were found to accompany severe attrition.

It is the purpose of the present paper to show the effect of attrited blacks on butyl. These blacks, because of their reduced structure, increased surface area and oxygen content, seemed ideally suited to the needs of butyl which, it is generally agreed, yields the best balance of vulcanizate qualities when it is reinforced with channel blacks, the rubber blacks most nearly like attrited blacks. The specific action of the oxygenated carbon surfaces in the reinforcement of butyl *(2 and 3)* gave added weight to this viewpoint.

Extensive studies have been made of the effect of attrited blacks in butyl. The following formulation was used in these studies, except where otherwise noted:

Enjay Butyl 217	100.0
Stearic Acid	0.5
Black	50.0
Zinc Oxide	5.0
Sulfur	2.0
Tetramethylthiuramdisulfide *	1.0
2,2′ Benzothiazyldisulfide**	1.0

* Tuads ** Altax

Compounds were cured for 45 minutes at 307° F.

The words "attrited" and "ball milled" will be used interchangeably in this section of the paper. Unless otherwise stated, they will refer to grinding carbon black which has been ball milled for 24 hours under standard conditions, as described previously *(1)*.

Changing Stress-Strain Properties

Butyl vulcanizates with attrited blacks are characterized by increased tensile strength and extensibility. In agreement with the effects of attrition on the blacks themselves, the changes are greater for vulcanizates with coarser blacks, and smaller for those with finer blacks.

The use of attrited blacks produces a shift in the stress-strain curve. For coarser blacks such as FT black, the curve, except at very low extensions, is shifted in the direction of increased stress (Figure 1). This, it is believed, results from the fact that higher orientation of the polymer chains *(3)* is obtained with attrited blacks as the sample is stretched above about 200 per cent.

Attrited black, being more active, tends to form more carbon-polymer associations. These added associations, like increased numbers of cross-links, are effective points of anchorage along the chains. Therefore, they lead to an earlier orientation of the polymer network as the sample is stretched. The thermal blacks, MT and FT blacks, lampblack and SRF black all show this kind of response in butyl. Tensile strength in all these cases is increased from 200 to 400 per cent.

The increased stress at low extensions—below 200 per cent—which is shown in the case of standard FT black in Figure 1, is believed to reflect higher internal viscosity in the vulcanizate. Initial movements of the polymer chains are restricted in this case by pigment clusters that must be disrupted before orientation can be achieved.

Relatively weak (van der Waals) forces holding particles of the filler together in cohesive pigment structures are thought to be broken as extension of the vulcanizate is initiated. The work required to break these structures is reflected in the increased stress at very low strains. These are the weak forces, pigment-to-polymer and pigment-to-pigment, which have been described by Blanchard and Parkinson *(4)*. Once they are broken, they are not immediately reformed and hence the stress-strain curve is softened by prestressing.

The stress-strain curve for the attrited black sample is not similarly softened by prestressing. Thus, the

The use of specially processed reinforcing agents offers a solution to the perennial problems of cure rate and flexibility of butyl rubber. The second article of this series deals with carbon-polymer relations.

effect which is shown here for attrited black is similar to the effect shown for butyl when it is heat interacted with carbon black *(5)* or silica *(6)*. Weak forces appear to be replaced by strong forces that link the polymer and black much more permanently in the resulting network.

Effects Differ by Type of Black

With finer blacks, invariably those of supernormal structure, the stress-strain curve is shifted in the direction of decreased stress. Figures 2 and 3, respectively, show the effects of attrited FEF and HAF blacks in butyl. These blacks are more active (i.e., have a greater reinforcing action) than the coarser blacks mentioned above. Reduced stress in these cases is attributed to the dissipation of secondary or aggregate structure, the effects of increased activity on the part of the attrited blacks being overshadowed in the vulcanizates by the internal viscosity effects already mentioned.

Standard blacks in this group, it should be remembered, are characterized by reticulate structures in which the cohesive forces holding particles together in clusters are strong enough to have been described as "fusion linkages" *(7)*. These clusters are probably not disrupted by the movement of polymer chains as the rubber sample is extended. Rather, they are turned, bent or otherwise displaced as units which present bulk or steric restrictions to chain motion. Secondary (van der Waals) forces, this time being thought of only in terms of pigment-polymer attachments, would of course provide additional restrictions to extension of the polymer network.

The highly reinforcing furnace blacks, ISAF and SAF, show an attrition effect in butyl similar to the blacks in Figures 2 and 3. Tensile strength in these blacks is increased 20 to 100 per cent, depending on original particle size of the black. Extensibility, which is always lower for blacks with apparently indestructible aggregate structures, is increased by 150 to 200 per cent in elongation.

Smallwood *(8)* proposed that the relative modulus of filled rubber stocks should depend on the volume

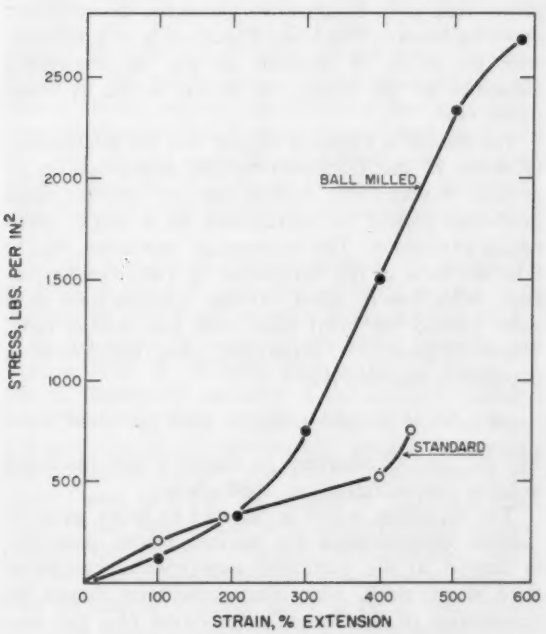

FIG. 1—Stress-strain properties of butyl are shown for vulcanizates with standard and ball milled FT blacks.

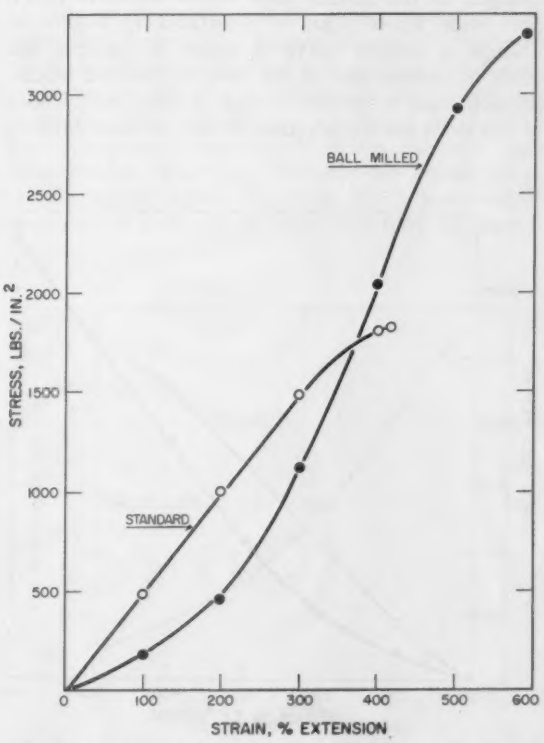

FIG. 2—Two curves depict stress-strain properties of butyl compounds made with standard and with ball milled FEF blacks.

loading of the filler, and be independent of the particle size:

$$M = M_o (1 + 2.5\ C) \quad (1)$$

where M=modulus of the filled stock, M_o=modulus of the gum stock, and C=the fractional volume concentration of filler in the rubber. The anomalous stiffening effects which Smallwood observed with all except the soft blacks (P33 and Thermax) were attributed to aggregation habits in the blacks. Guth and Gold *(9)* later extended the equation to fit consideration of higher filler loadings:

$$M = M_o (1 + 2.5\ C + 14.1\ C^2) \quad (2)$$

Modulus and Geometric Complexity

Zapp and Guth *(10)* studied the effect of the volume fraction concentration of fillers in butyl. They reported that, with carbon blacks, a large divergence from the theoretical curve predicted by equation (2) was found. Using equilibrium stress at low strain (50 per cent extension), the values obtained for 30 volumes of black varied by a factor of 2, depending on the black employed. The points for the coarser blacks fell below the theoretical curve, those for the finer blacks above it. The finer blacks, it should be pointed out, were structure blacks for which equation (2) would not be expected to hold since it was developed for unassociated spheres.

With fixed carbon concentration, the modulus of butyl with attrited blacks remains essentially unchanged as the surface area of the black is varied over wide limits. This is illustrated in Figure 4. Though a smooth curve is drawn to indicate the effect of surface area in the case of standard blacks, no such effect is believed to exist. Rather, the carbons in this series are considered to belong to three different

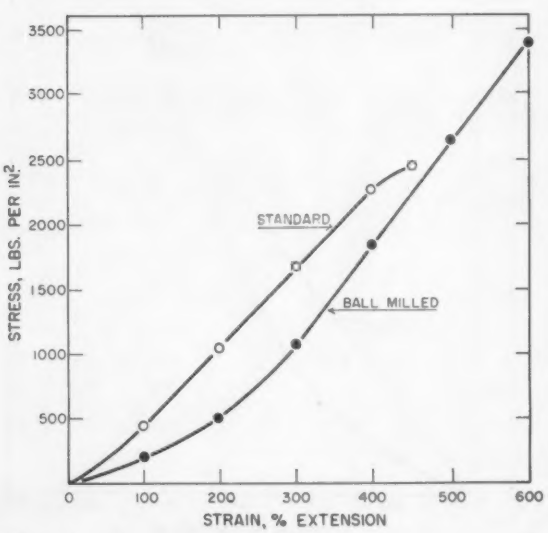

FIG. 3—The stress-strain properties of butyl are given for vulcanizates with standard and ball milled HAF blacks.

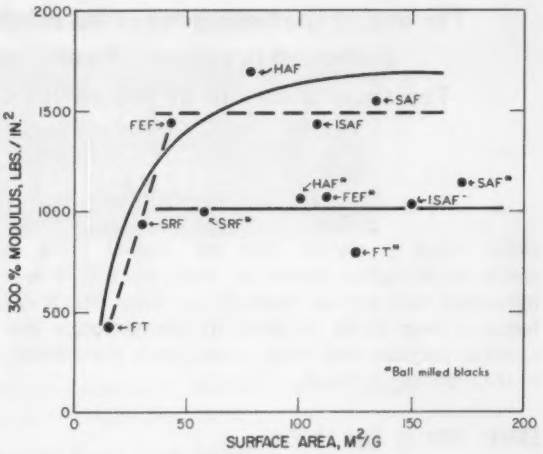

FIG. 4—The effect of surface area of six types of black on the modulus of butyl vulcanizates is shown above for standard and ball milled black compounds. Curves have been drawn to indicate possible relationships.

geometric shape groups. The geometric shape in each case depends on the extent of aggregate structure remaining in the black after it is milled in rubber. Thus, as indicated by the broken lines, modulus increases with geometric complexity from FT to SRF to FEF. The remaining blacks have roughly the same geometric complexity (i.e., the same aggregate structure or oil absorption capacity) and yield essentially the same modulus.

If, as we have assumed, modulus differences with standard blacks are the result of variations in their geometric forms, then the principal effect of attrition in this case is to equalize the geometric denominator of all the blacks. This kind of analysis is in agreement with the effect of attrition on the oil absorption capacities of the blacks, as shown in the previous paper *(1)*.

The results in Figure 4 suggest that the relationship of stress to the fractional volume concentration of attrited blacks with widely varying surface area properties should be represented by a single, theoretical expression. This expression, moreover, should take the form of the Smallwood or Guth-Gold equation. With this in mind, volume concentration data were plotted for butyl filled with ball milled HAF blacks (Figure 5). From this plot, the following expression was derived:

$$M = M_o (1 + 40C - 460C^2 + 2360C^3 - 3380C^4) \quad (3)$$

M, M_o, and C referring to modulus and fractional volume concentration, as used above.

This equation, which is believed to relate stress to volume concentration for attrited blacks generally, is limited to the particular experimental conditions used in our work. Since these conditions exceed the restrictions of Smallwood's derivation *(8)*, the constants in equation (3) cannot be accepted in any theoretical sense. However, when combined with the

TABLE I — EFFECT OF ATTRITED BLACKS ON DYNAMIC PROPERTIES OF BUTYL

Blacks	Condition	$\eta f \times 10^{-6}$ (poises x cps)	$K \times 10^{-7}$ (dynes/cm²)	% Relative Damping
SAF (Vulcan 9)	Standard	8.05	12.10	41.9
	Ball Milled	3.56	8.47	28.8
HAF (Philblack O)	Standard	5.37	11.80	30.6
	Ball Milled	2.12	6.80	22.1
FEF (Philblack A)	Standard	3.90	10.30	26.4
	Ball Milled	1.52	5.65	19.4
SRF (Furnex)	Standard	2.50	8.43	21.2
	Ball Milled	1.26	5.62	16.5

data in Figure 4, they seem adequate to indicate the general form of the predicted theoretical relationship.

Improved Dynamic Properties

The dynamic properties of butyl-carbon black systems were studied using the modified Yerzley oscillograph according to the method of Baldwin *(11)*. In this test, the internal viscosity η is determined from cyclic deformation of the vulcanizate in free vibration at frequency f. The resulting term, ηf, is an absolute damping term describing the energy lost as heat, and is therefore inversely proportional to "rubberiness" or elasticity. The dynamic modulus K and the per cent relative damping are also obtained from further treatment of the test results.

The dynamic properties of butyl are greatly improved with attrited blacks. Flexibility and suppleness are greatly increased. These changes, immediately apparent in the feel of the vulcanizates, are demonstrated by the data in Table I. With attrited blacks, ηf is decreased 50 to 60 per cent. Dynamic modulus, the manifestation of combined viscous and elastic effects, reflects the softening due to reduced internal viscosity and is therefore also decreased. The per cent relative damping, calculated from the ratio $\eta f/K$ defines the total change in rubberlike properties, and shows a very significant advantage for attrited blacks.

Unlike the case of modulus referred to earlier, the changes in dynamic properties of butyl are not principally due to reduced structure in the attrited blacks. With acetylene (Shawinigan) black, for example, less than a third of the total decrease in ηf occurs as the oil absorption capacity of the black is reduced from 34 to less than 10. The further, very substantial decreases in ηf, occurring with attrited Shawinigan blacks having roughly the same oil absorption capacity, must therefore be related to increased reactivity of the blacks due to chemical changes accompanying the attrition. Surface area increases which lead to these chemical changes would, by themselves, have an exactly opposite effect, it being well known that finer blacks produce more stiffening in butyl than similar coarser blacks (compare ηf values for standard FEF, HAF and SAF blacks in Table I).

Evidence, both in our work and in the work of Dobbin and Rossman *(12)*, indicates that the tensile strength of the vulcanizate is very little affected by breakage of carbon structure alone. The large increases in tensile strength which are obtained with fully attrited blacks must, therefore, be attributed to the combined effect of increased surface area and enhanced chemical reactivity. In this connection, it is pertinent to note that butyl with special blacks—HAF blacks prepared directly with low structure by modified burning techniques—resemble butyl with mildly attrited black (i.e., blacks ball milled with flint pebbles) *(1)*. Dynamic properties are somewhat improved over those obtained with standard HAF black, but tensile strength and elongation remain essentially unchanged. This result is presented as independent evidence for the increased surface reactivity of fully attrited blacks.

Data in Table II show the effect of attrited blacks on some of the other properties of butyl. "Carbon gel" or bound rubber is increased, the values for attrited black systems being two or three times higher than those for the corresponding standard black systems. Thus, closer associations of polymer and black are envisioned. Bound rubber tests were made after immersing approximately 0.5 gram of the raw butyl-black masterbatch in 100 cc. of cyclohexane for one week at 70° F.

Resistivity and Abrasion Resistance

Electrical resistivity is increased. This is a manifestation of the opportunity for particulate rather than aggregate dispersion. Higher electrical resistivity would doubtless be obtained with attrited blacks were it not for the difficulty which attends their dispersion in rubber. This difficulty, it is believed, arises from greatly reduced viscosity of rubber mixtures with these blacks. When the mixtures are submitted to the mechanical action of milling, much less work is done than is normally the case with fully reinforcing

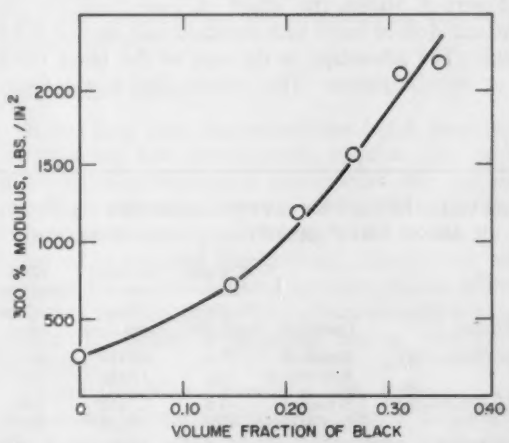

FIG. 5—This graph traces the effect of volume fraction concentration of attrited HAF blacks on the modulus of butyl vulcanizates.

carbons. The importance of mechanical work, not only in assuring good dispersion, but also in creating chemical environments favorable to carbon-polymer interaction, is adequately supported in the literature *(13, 14 and 15)*.

Abrasion resistance, as measured with the modified Lambourn abrader *(16)*, is improved as a result of severe carbon attrition. Table II shows that the abrasion losses in butyl are reduced 25 to 50 per cent by the substitution of attrited for standard blacks. This is an interesting result which ought to be examined more thoroughly in the light of the recently developed, commercial butyl tire.

Apparent Cure Rate of Butyl Rubber

Good dynamic properties are a prime requisite to the satisfactory performance of tire carcass and tread compounds. Therefore, a study was undertaken to relate the dynamic properties of butyl to cure rate, as it is affected by variation in the type of carbon black employed. Taking Goodrich Flexometer behavior as the criterion, tests were run under drastic conditions for one half hour at 100° C., using a load of 89 lb. in.^{2} with a ¼-inch stroke. In the test, butyl vulcanizates with standard and attrited HAF blacks were cured for various times at 300° F. A typical styrene rubber tire tread compound with standard HAF black was added to the program as the control.

Under rigorous flexing conditions, a rubber vulcanizate is subjected to the dual action of heat and cyclic stressing. Network structure is thereby broken down. The sample takes on a creep or permanent set whose magnitude depends on the extent of network breakdown. Poor hysteresis properties cause high internal temperatures during flexing thus aggravating the breakdown process. Unfavorable hysteretics show up quickly in the Goodrich Flexometer test by the development of high dynamic drift (a creep term derived as the difference between the initial and final dynamic compression) and, in the worst cases, by the development of internal porosity as well.

Figure 6 shows the effect of cure time on the dynamic drift of butyl with standard and attrited HAF black. The advantage in the case of the latter black is at once apparent. The broken line in the figure

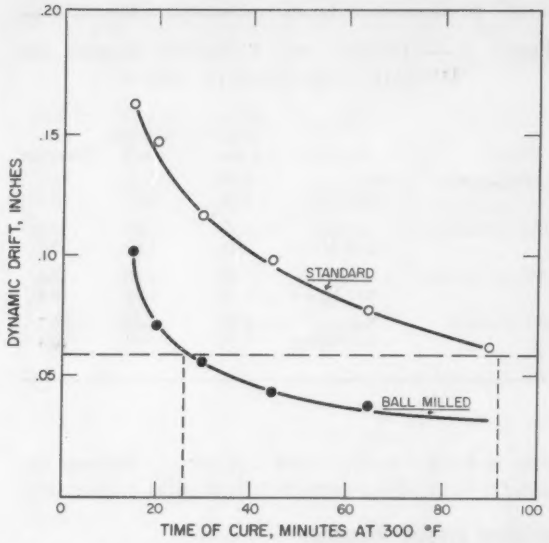

FIG. 6—Effect of time of cure on the dynamic drift of butyl is shown for standard and ball milled HAF blacks. The broken line refers to the styrene rubber control.

gives the dynamic drift of the control styrene rubber compound cured for 20 minutes at 300° F., this being judged a cure equivalent to commercial styrene rubber tire treads. Butyl with standard black must be cured 92 minutes at 300° F. to obtain the same low value for dynamic drift, but butyl with attrited black needs only 26 minutes of cure. Thus, in a practical sense at least, a very significant advantage in apparent cure rate is demonstrated for attrited black.

Sufficient Cross-Link Density Is the Problem

Data such as those presented in Figure 6 can be used to reinforce the feeling, for some time held by the author, that in the strict sense, cure rate is not the critical problem with butyl. Swelling and modulus tests indicate that though the absolute values may be different, maximum cross-link density is obtained at roughly the same time for butyl and styrene rubber stocks cured at 300° F. The problem then is not how long it takes to reach this maximum cross-link density, but rather how long it takes to attain a cross-link density sufficiently high to overcome undesirable hysteretic effects which are believed to result from improper utilization of the carbon black filler. The heat treatment of rubber-standard black masterbatches, it will be remembered, yielded rapid response in styrene or natural rubber *(5)*.

The interaction of carbon and polymer which was proposed as the requisite for reinforcement in this heat treatment work is considered to take place very rapidly in these rubbers. The greatest portion of potential carbon-polymer associations are made without any heat treatment at all, during the course of normal mixing and in the early stages of vulcanization before the polymer chains are immobilized by cross-linking. Butyl with standard blacks, on the other

TABLE II—EFFECT OF ATTRITED BLACKS ON BUTYL "CARBON GEL," RESISTIVITY AND ABRASION

Blacks	Condition	"Carbon Gel" Weight % Insol. Pol.	Electrical Resistivity (ohm/cm)	Abrasion Loss (cc/km/amp)
SAF (Vulcan 9)	Standard	11.0	4.8×10^{7}	0.71
	Ball Milled	31.0	1.8×10^{9}	0.54
HAF (Philblack O)	Standard	7.6	1.7×10^{8}	0.89
	Ball Milled	17.0	3.9×10^{10}	0.50
FEF (Philblack A)	Standard	3.8	1.3×10^{8}	1.10
	Ball Milled	8.3	8.1×10^{11}	0.47

hand, requires severe heat treatment to produce these carbon-polymer associations in sufficient quantity *(5)*. Without heat treatment it must, therefore, be cured for relatively long times to obtain adequate hysteresis properties, the highest possible cross-link density being required to compensate for the unfavorable disposition of the filler.

Carbon-polymer associations are probably made in greatest quantity in the early stages of vulcanization, before the system is immobilized by cross-linking. Relatively few are likely to form as the cure is taken from the onset of cross-link formation to its highest cross-link density level. With attrited blacks, butyl-carbon black associations are made quickly and with relative ease, as is the case with standard blacks and natural or styrene rubber. Shorter cures are therefore required to obtain suitable hysteretics (Figure 6), the problem of improper filler disposition being largely overcome by the more favorable physical and chemical properties of the new blacks.

Solving the Cure Time Dilemma

The curing of butyl for long time periods serves no useful purpose other than this hysteretics effect. Many other properties are adversely affected. Among these are tensile strength particularly with coarser blacks, extensibility, and tear strength.

Zapp *(16)* has related the abrasion losses in butyl tread stocks to the ratio of K/R, where K is the dynamic modulus of the vulcanizate and R its rupture energy, taken as the area under the stress-strain curve. Using Lambourn abrasion data, he was able to correlate abrasion loss with K/R for a series of butyl compounds which varied widely in composition. Finally, road tests on butyl tires were employed to confirm the validity of these results.

Attrited blacks not only improve the abrasion resistance of butyl, as already shown (Table II), but they considerably reduce the serious decay imposed on this property by extending the time of cure. Figure 7 uses Zapp's ratio, Ky/R to make this point, Ky in this case referring to dynamic modulus as given in the modified Yerzley Test mentioned earlier. Abrasion loss, which is directly related to Ky/R, is seen to rise sharply as the cure time is increased for the compound with standard HAF black.

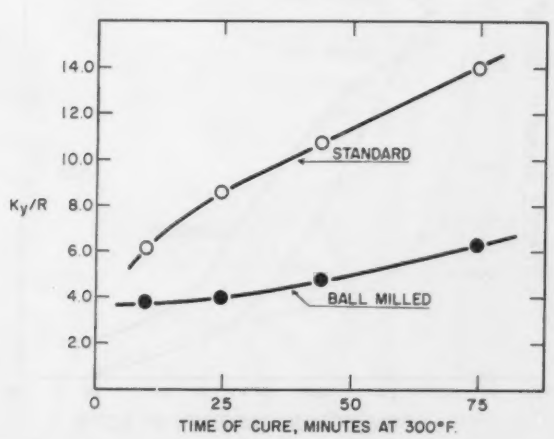

FIG. 7—Effect of time of cure on Ky/R values of butyl with standard and ball milled HAF blacks compares abrasion losses.

TABLE III—EFFECT OF ATTRITED HAF BLACK ON THE HARDNESS OF BUTYL

Cure Time (minutes at 300° F.)	Static Compression (in.)* Standard HAF	Static Compression (in.)* Ball Milled HAF	Shore Hardness Standard HAF	Shore Hardness Ball Milled HAF
20	0.174	0.208	47	37
30	0.145	0.188	52	39
45	0.128	0.175	57	44
65	0.110	0.155	61	47
90	0.110	——	63	49

* Goodrich Flexometer Test.

Thus, for the best abrasion resistance, short cures would be demanded. But, as we have already seen in Figures 6, short cures are not practical because suitable hysteretics, the kind that one needs for a tire tread, are not possible unless the cure is extended. In conventional butyl compounds, therefore, abrasion resistance must be sacrificed to assure satisfactory dynamic behavior in the tread. Though heat treatment and oil plasticization permit significant improvements in this situation, great care must still be exercised to get the best balance of both properties.

The controversy between abrasion resistance and hysteretics in butyl cures is resolved by the use of attrited blacks (Figures 6 and 7). Not only are good abrasion resistance as well as good dynamic properties effected at low cure times, but, in addition, sensitivity to variations in the time of cure is greatly reduced. These results indicate again that the overall relationship of attrited black to polymer is much more favorable. Butyl-carbon associations, as already stated, are apparently made quickly in sufficient number, without the need for extended mixing or heat treatment. It is believed that this effect is related to both, reduced structure and increased activity, in the attrited blacks.

Using "Ultra" Blacks

It has long been recognized that butyl, because of its relatively low unsaturation, requires the use of more active vulcanization accelerators than are used in either natural or styrene rubber. Without these "ultra" accelerators, satisfactory cures would not be achieved in practical time periods. The present work suggests the additional need for ultra blacks in butyl to assure that full reinforcing effects are also obtained within the limits of practical mixing and curing schedules.

In the Goodrich Flexometer test, a thermocouple at the base of the sample is connected to an automatic recorder which gives a complete temperature record for each run. Using the maximum temperature from each of these records, the effects of standard

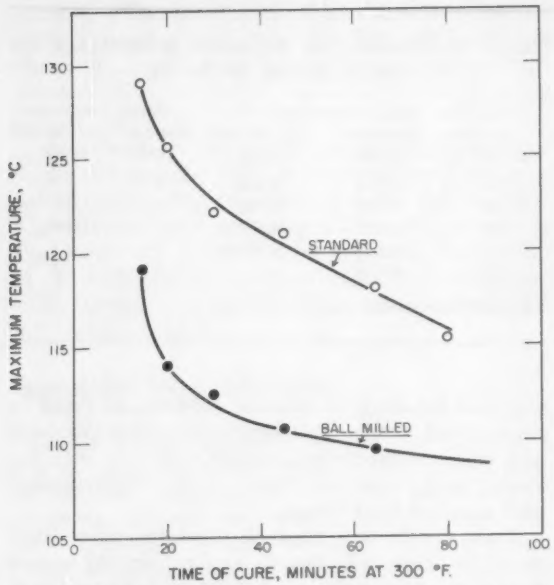

FIG. 8—Effect of time of cure on maximum temperature of butyl with standard and ball milled HAF blacks was measured by Goodrich Flexometer.

and ball milled blacks are shown in Figure 8. The relatively very low heat build-up which is obtained with ball milled black is surprising, the vulcanizates being much softer than similar vulcanizates with standard black (Table III).

The initial dynamic compression in the Flexometer test is roughly half the static compression shown in the table. From this it is obvious that the amplitude of deformation is greater in the vulcanizates with ball milled black and, as a result, higher heat build-up would be expected. Shore Hardness data, also given in Table III, further illustrate the increased softness resulting from the use of attrited black.

Sensitivity of Tensile Strength

The sensitivity of tensile strength to time of cure that obtains with conventional butyl compounds, particularly those containing coarser furnace and thermal blacks, has already been mentioned. Figure 9 shows that this pronounced sensitivity in the case of standard FT black disappears when the black is attrited (30 hours in a 17-gallon ball mill). The argument, that one need not worry about tensile strength decays if the cure time is limited, is not consistent with the hysteretic considerations mentioned previously. In addition, it can be shown (Figure 10) that butyl with standard FT black behaves more like a gum than a reinforced network when the cure is limited (15 minutes at 307° F.) to assure the highest value of tensile strength.

Stress is developed very slowly as the vulcanizate is extended. Crystallization, which is evidenced by a sharp upturn in the stress-strain curve, is delayed until the sample is extended 500-600 per cent. Long range crystallization is apparently not uniformly interrupted in this case, the black probably being dispersed in aggregates or clusters. As a result, a tear or break, initiated at the edge of the dumbbell specimen (Figure 11), proceeds in the direction of the strain and is propagated along the edge of the oriented crystallite.

This fibrous type of behavior, so evident in the standard FT black compound shown in Figure 11, is almost always obtained with pure gum butyl. Attrited black, by contrast, produces legitimate reinforcing effects indicated by increased values for stress above about 200 per cent extension (Figure 10), and by the dissipation of fibrous effects when the specimen is broken (Figure 11). Uniform interruptions of long range crystallization are apparently provided by the black.

Finally, close inspection of the dumbbells in Figure 11 reveals higher permanent set in the case of standard black. Another disadvantage of short cures is thus made evident for this kind of system. Figure 12 shows how the tensile strength of butyl with MT black is affected by time of cure. Numbers on the curves refer to hours the black was ball milled in a 17-gallon mill.

More Black for Better Qualities

The advantages of attrited blacks are maintained over a wide range of black concentrations. This is demonstrated in Table IV where data are shown for butyl compounds with 20 to 60 volumes of standard and attrited HAF black, respectively. A naphthenic base oil (Necton 60) was also added at 15 parts/100 parts of polymer in the compounds to facilitate mixing at high filler concentrations. Increased tensile strength, elongation and flexibility are found at each concentration for the samples with attrited black, the advantages of the latter being somewhat greater at higher concentrations of black.

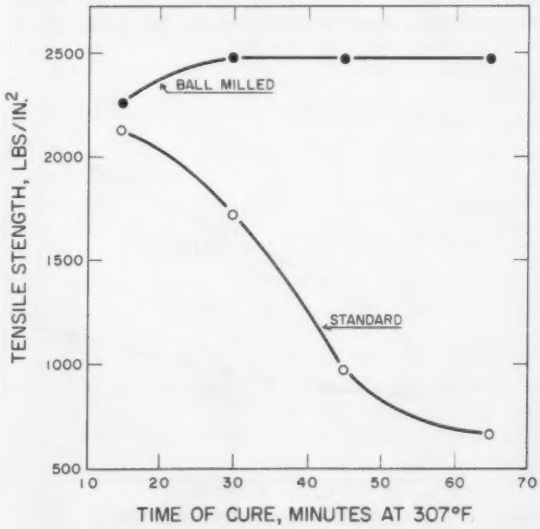

FIG. 9—Two curves show the effect of time of cure on tensile strength of butyl with standard and ball milled FT blacks.

An interesting aspect of this concentration study is the possibility which seems to be offered for using more black. If, for example, it is desired to have the same tensile strength and elongation in the attrited black compound as in the conventional black compound, about 25 volumes more of attrited black can be used. This relationship, when put in terms of tensile product (tensile strength x elongation), is shown for HAF black systems in Figure 13. Work in our laboratory has shown good correlation between tensile product and Lambourn abrasion resistance. For this reason, the extremely high values of tensile product in the figure are of particular interest.

Consideration of other properties in the vulcanizate imposes different concentration limits for the attrited black. At the same Shore Hardness as the conventional compound's, 20 volumes more of attrited black can be used. For the same dynamic properties, only 10 to 15 volumes more are tolerated. The absolute difference in concentration in each of these cases is not important for the purpose of this paper. What is important is the realization that attrited blacks, in addition to offering the means for making improved butyl compounds, permit production of established compounds at reduced cost through the use of higher filler concentrations.

Ready Response to Heat Treatment

Previous work in these laboratories *(3, 5, 17 and 20)* has shown that the heat treatment of butyl-carbon black mixtures leads to improvements in the properties of the resulting vulcanizates. The specific action of oxygen on the carbon surface was reported, and it was pointed out that non-oxy blacks—the furnace and thermal blacks—do not respond directly to heat treatment, selected chemical agents being required to promote the interaction. The attrition of carbon black, since it yields oxy blacks from non-oxy blacks, produces pigments which respond directly and readily to heat treatment.

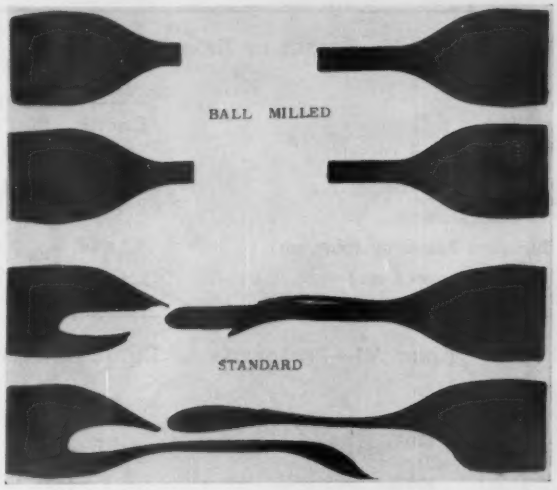

FIG. 11—Photographs of samples compare tensile breaks in butyl with standard and with ball milled FT black compounds cured for 15 minutes at 307° F.

Table V shows a typical set of data obtained from work with three attrited furnace blacks. A common masterbatch containing polymer, black and stearic acid was mixed under conventional conditions on a 6 x 12-inch mill. Half the masterbatch received no further treatment. The other half was heat treated by milling it for 10 minutes at 300° F. Curing agents were finally added to each masterbatch, and the resulting compounds were cured as described above.

The data in Table V are in complete agreement with previous heat treatment work. Such treatment is

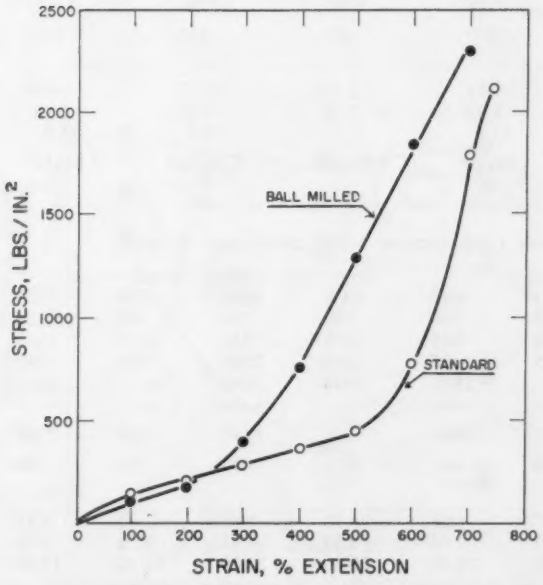

FIG. 10—Stress-strain properties of butyl compounds cured 15 minutes at 307° F. are shown for standard and ball milled FT blacks.

TABLE IV—PROPERTIES OF BUTYL WITH VARYING CONCENTRATIONS OF STANDARD AND ATTRITED HAF BLACK

Volumes of HAF Black	Condition of Black	Tensile Strength (lb/in²)	% Elongation	$\eta f \times 10^{-6}$ (poises x cps)
20	Standard	2690	635	1.64
	Ball Milled	2900	765	1.10
30	Standard	2485	575	3.42
	Ball Milled	3130	745	1.71
40	Standard	2100	475	6.64
	Ball Milled	2720	680	3.51
50	Standard	1500	390	17.40
	Ball Milled	2400	555	6.95
60	Standard	1170	350	(too stiff)
	Ball Milled	2100	500	9.16

TABLE V—EFFECT OF HEAT TREATMENT ON PROPERTIES OF BUTYL WITH ATTRITED BLACKS

Black	SAF (Vulcan 9)		HAF (Philblack O)		FEF (Philblack A)	
	Control	Heat Treated	Control	Heat Treated	Control	Heat Treated
Tensile Strength (lb/in²)	3490	3750	3075	3365	2960	3150
300% Modulus (lb/in²)	1205	1540	1235	1580	1230	1520
% Elongation	575	525	530	485	525	460
Electrical Resistivity (ohm/cm)	1.2×10^{8}	2.3×10^{8}	1.2×10^{9}	6.8×10^{11}	8.1×10^{11}	3.7×10^{12}
$\eta f \times 10^{-6}$ (poises x cps)	4.86	3.18	2.37	1.70	1.42	1.10

TABLE VI—PROPERTIES OF BUTYL-ELASTOPAR COMPOUNDS WITH STANDARD HAF BLACK

	Control	Heat Treated			
Elastopar, PHP:	0	0	0.5	1.0	1.5
Modulus at 100%	405	400	450	450	450
lb/in² 200%	990	1050	1270	1490	1495
300%	1675	1745	2140	2490	2515
400%	2170	2290	—	—	—
Tensile Strength, lb/in²	2350	2385	2650	2840	2855
% Elongation	465	430	385	355	350
Dynamic Properties:					
$\eta f \times 10^{-6}$, poises x cps	5.94	5.35	3.64	3.10	2.84
$K \times 10^{-7}$, dynes/cm²	12.40	10.90	9.77	9.43	9.14
% Relative Damping	38.30	39.10	31.10	27.90	26.60
Electrical Resistivity, ohm/cm	6.09×10^{7}	6.49×10^{7}	6.73×10^{7}	9.12×10^{7}	1.02×10^{8}

TABLE VII—PROPERTIES OF BUTYL-ELASTOPAR COMPOUNDS WITH BALL-MILLED HAF BLACK

	Control	Heat Treated			
Elastopar, PHP:	0	0	0.5	1.0	1.5
Modulus at 100%	195	220	240	225	220
lb/in² 200%	460	600	680	760	760
300%	920	1300	1585	1815	1815
400%	1585	2160	2650	2940	2950
500%	2340	2990	—	—	—
600%	2900	—	—	—	—
Tensile Strength, lb/in²	2950	3125	3275	3500	3215
% Elongation	615	530	475	475	450
Dynamic Properties:					
$\eta f \times 10^{-6}$, poises x cps	2.15	1.73	1.28	1.16	1.19
$K \times 10^{-7}$, dynes/cm²	6.66	6.32	5.98	5.95	5.98
% Relative Damping	27.5	23.8	19.1	17.6	18.0
Electrical Resistivity, ohm/cm	7.16×10^{7}	1.09×10^{8}	9.35×10^{10}	8.48×10^{12}	7.81×10^{12}

TABLE VIII—PROPERTIES OF BUTYL-ELASTOPAR COMPOUNDS WITH STANDARD BLACKS

	Not Heat Treated				Heat Treated			
	SAF	MPC	HAF	SRF	SAF	MPC	HAF	SRF
Modulus at 100%	350	280	305	310	370	310	440	335
lb/in² 200%	885	700	1100	815	1025	950	1350	1050
300%	1815	1460	2085	1400	2100	2025	2510	1940
400%	2750	2300	—	1800	3010	3005	—	—
500%	—	3000	—	—	—	—	—	—
Tensile Strength, lb/in²	3390	3350	2760	1890	3260	3440	3055	2200
% Elongation	495	575	400	440	435	470	395	360
Dynamic Properties:								
$\eta f \times 10^{-6}$, poises x cps	5.75	2.50	3.07	1.59	3.52	1.65	2.60	1.31
$K \times 10^{-7}$, dynes/cm²	12.00	7.69	9.37	7.05	9.50	6.81	9.28	6.78
% Relative Damping	38.20	27.60	27.80	20.10	30.90	21.30	24.30	17.40
Electrical Resistivity, ohm/cm	1.0×10^{8}	4.6×10^{8}	9.4×10^{7}	1.5×10^{10}	9.3×10^{7}	4.8×10^{10}	1.1×10^{11}	5.3×10^{10}

useful for attrited blacks to produce vulcanizates with higher modulus and tensile strength and with increased flexibility or elasticity. Electrical resistivity may or may not be increased depending on the black. Generally speaking, attrited blacks with very high surface area and oxygen content are difficult to disperse. High electrical resistivities are not obtained with these blacks unless drastic measures, such as concentrated masterbatching, are used in the preparation of the vulcanizate.

Attrited blacks appear to respond more sharply to heat treatment than ordinary channel blacks. With ten minutes of hot milling, the modulus of butyl with MPC black is increased only 50 to 100 lb./in.^{2} and the bound butyl or "carbon gel" from 8.5 to 12.0 per cent. The modulus responses, which are shown to result from the similar heat treatment of attrited blacks in Table V, are much larger than this. The corresponding "carbon gel" increases are likewise larger, going from 8.3 to 20 per cent for FEF black, from 17 to 30 per cent for HAF black, and from 31 to 45 per cent for SAF black.

Obtaining Maximum Reinforcement

This more rapid response to heat treatment is cited as additional evidence of the increased chemical activity which characterizes attrited blacks. Such activity is the result of oxy functionality reported to be different from that of channel blacks *(18)*, or of increased free radical activity associated with increased numbers of unpaired electrons, or both. It permits maximum reinforcement effects to be obtained without the use of drastic, commercially impractical heat treatment processes. If carbon-polymer bonding is accepted as a factor in the mechanism of carbon reinforcement, heat treatment experiments indicate a more favorable reaction kinetics for attrited blacks.

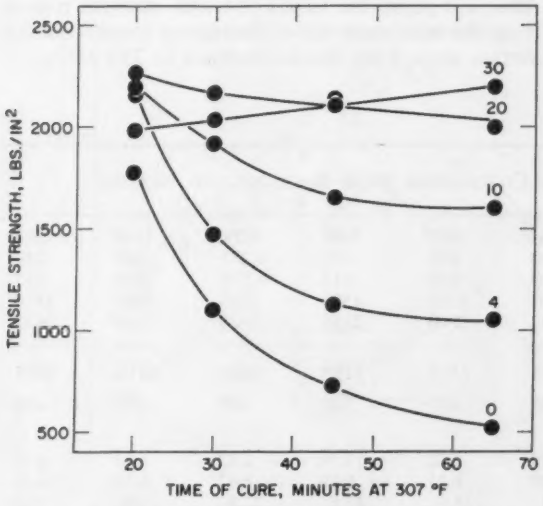

FIG. 12—A detailed consideration of effect of time of cure on tensile strength of butyl is given for samples with MT blacks before and after attrition.

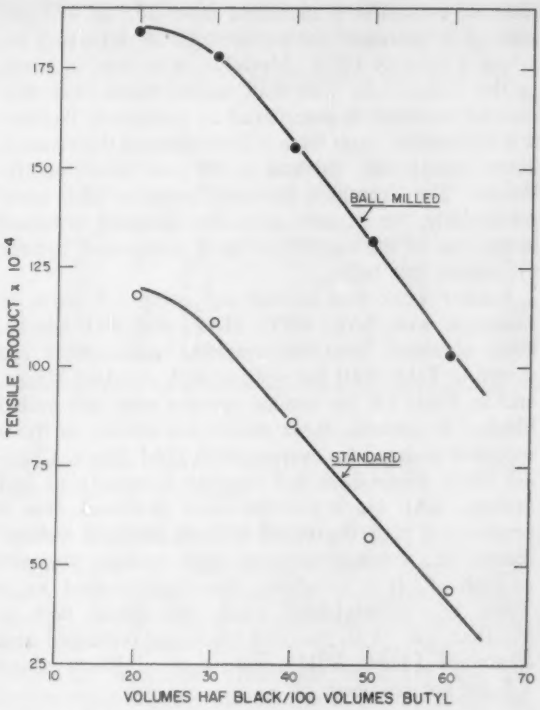

FIG. 13—The effect of black concentration on tensile product of butyl is shown for standard and ball milled HAF blacks.

Butyl vulcanizates are obtained with even higher quality than those reported previously, when ball milled black is used in systems which are heat treated with an efficient promoting agent like Monsanto Elastopar (N-methyl-N, 4-dinitrosoaniline) *(19)*. Data in Tables VI and VII show the effect of adding increasing amounts of Elastopar to butyl compounds with standard and ball milled HAF blacks, respectively. Heat treatment again consisted of milling the polymer-black-Elastopar masterbatch for ten minutes at 300° F.

The Case for Ball Milled Blacks

The advantages of ball milled blacks are obvious from the data in Tables VI and VII. This is an important point stressed here because, while Elastopar is effective in improving the properties of butyl with standard blacks, it is equally effective in improving the properties of butyl with ball milled blacks. This common advantage, we believe, arises from maintenance of the proper physical and chemical relationship between the polymer and the black, one which prevails despite variations in either the composition or the manipulation of the compound.

The concentration of Elastopar appears to be very nearly optimum at 1.0 part per 100 parts of polymer. For systems heat treated with this concentration of Elastopar, the advantages associated with the use of ball milled black are: tensile strength is increased 23 per cent (from 2840 and 3500 lb./in.^{2}) and the

ultimate extension is increased from 355 to 475 per cent; ηf is decreased 63 per cent (from 3.10 to 1.16 poises x c.p.s. x 10^{-6}). Modulus, it is true, is lower in the vulcanizate with ball milled black, but this reduced modulus is considered an advantage because it is believed to result from a diminution of the viscous, hence undesirable, element of the total stress contribution. The decreased dynamic modulus and, more particularly, the decreased relative damping obtained in the case of the ball milled black compound, appear to support this belief.

Similar work was carried out using 1.5 parts of Elastopar with SAF, MPC, HAF, and SRF blacks. Data obtained from the resulting vulcanizates are shown in Table VIII for systems with standard blacks, and in Table IX for similar systems with ball milled blacks. In general, these results are similar to those reported in detail for systems with HAF black. Channel black alone does not respond favorably to ball milling. SAF black has the main drawback that it produces a high degree of stiffness in butyl vulcanizates; i.e., vulcanizates with high internal viscosity or high ηf. It is surprising, therefore, to find, as in Table IX, a butyl-SAF black vulcanizate with ηf less than 2.0. With standard black and promoted heat treatment (Table VIII), values of ηf below about 3.5 are not obtained.

Advantages of Roller Milling

The data presented previously have referred to blacks attrited by ball milling. Additional experiments were run to determine what effects would be obtained if the black were attrited by the much more efficient two-roller mill process. Table X compares data from HAF blacks attrited by two-roller and by ball milling. The roller mill process produces blacks with the same general behavior as blacks attrited by ball milling. Suitably modified blacks apparently can be prepared by roller mill, without using long-time, and therefore more costly, ball milling.

Finally, the curves in Figure 14 show that roller mill attrition with FT black produces greatly increased tensile strength and reduced sensitivity of tensile strength to time of cure. These results are similar to those reported above for ball milled FT black.

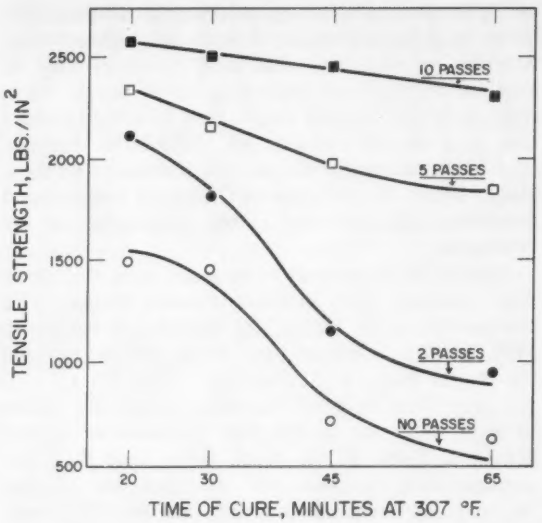

FIG. 14—Effect of time of cure on the tensile strength of butyl with two-roller mill attrited FT blacks is given for various numbers of passes.

As already mentioned, it is more difficult to effect a good dispersion with attrited blacks than with the corresponding standard blacks. This difficulty is associated, in large part, with the reduced viscosity of rubber-attrited black mixtures and, as a result, with the lesser amounts of work in milling these mixtures. Good dispersion becomes more difficult as the surface area of the blacks increases. Figure 15 shows this general relationship as it is related to the tensile strength of the corresponding butyl vulcanizates. Tensile strength increases with the surface area of the blacks until the latter reaches roughly 150 M^2/g. After this point, the values of tensile strength regress from the maximum value, decreasing steadily as the surface area of the blacks increases to 215 M^2/g.

TABLE IX—PROPERTIES OF BUTYL-ELASTOPAR COMPOUNDS WITH BALL-MILLED BLACKS

	Not Heat Treated				Heat Treated			
	SAF	MPC	HAF	SRF	SAF	MPC	HAF	SRF
Modulus at 100%	270	275	280	230	270	275	260	240
lb/in² 200%	555	525	740	630	615	570	800	735
300%	1125	855	1700	1525	1350	1035	2000	1820
400%	2010	1400	2740	2360	2355	1650	3160	2835
500%	2900	2015	—	—	—	—	—	—
Tensile Strength, lb/in²	3260	2335	3255	2575	3250	2220	3410	2835
% Elongation	560	570	490	460	520	505	435	400
Dynamic Properties:								
η f x 10^{-6}, poises x cps	2.62	1.98	1.79	1.22	1.74	1.72	1.26	1.21
K x 10^{-7}, dynes/cm²	8.08	7.10	7.09	6.11	6.76	6.62	6.32	6.23
% Relative Damping	27.6	24.1	22.1	18.0	22.5	22.8	18.0	17.5
Electrical Resistivity, ohm/cm	$7.0x10^{7}$	$4.5x10^{13}$	$3.9x10^{20}$	$4.4x10^{13}$	$3.8x10^{13}$	$4.5x10^{13}$	$5.0x10^{13}$	$4.8x10^{13}$

TABLE X—COMPARISON OF ROLLER MILL AND BALL MILL ATTRITED HAF BLACKS

	No. of Passes, Rubber Mill				No. of Hours, Ball Mill			
	0	2	4	7	0	8	16	24
Properties of Black:								
Weight % Oxygen	0.64	0.97	1.43	1.56	0.58	1.04	1.45	1.72
Surface Area, M^2/g	80	128	146	164	80	95	116	136
Slurry pH	7.00	4.10	3.70	3.70	7.00	4.30	4.10	3.50
Properties of Vulcanizate:								
300% Modulus, lb/in^2	1800	1365	1115	930	1745	1450	1325	1110
Tensile Strength, lb/in^2	2450	2880	2900	2800	2640	2925	3215	2610
% Extension	430	535	560	585	440	490	540	510
η f x 10^{-6}, poises x cps	5.05	2.51	2.11	1.85	4.22	2.69	2.36	2.40
K x 10^{-7}, dynes $/cm^3$	10.70	7.00	6.51	5.83	9.81	7.77	7.10	6.92
% Relative Damping	37.60	30.10	27.60	27.00	35.10	29.20	28.20	29.30

The relationship of Figure 15 is drawn as a trend with a sharp breaking point. While the effects are doubtless not this sharply defined, the figure is useful in showing a result which is believed to be related to dispersion. Independent evidence from the Cabot laboratories *(18)* has confirmed that the dispersion of attrited blacks in butyl is poor when the surface area of the black goes beyond 140-160 M^2/g. This evidence, along with the present work, suggests that much higher tensile strengths might be obtained with butyl if the means were found for effectively dispersing attrited blacks which, because of their unusually high surface area, cannot be suitably dispersed by ordinary milling techniques.

Figure 16 shows that the tensile strength of butyl with FT and MT blacks, respectively, reaches a maximum after only 20 hours of ball milling in a 17-gallon mill. This limitation is considered to be due to the dispersion difficulties just discussed. By using a concentrated masterbatch mixing procedure, for example, it would be possible to increase tensile strength from 2400 to 2850 lb./in.² with FT black, ball milled for 30 hours.

Summary of Effects on Butyl Rubber

The use of attrited blacks leads to butyl vulcanizates with greatly improved properties. Tensile strength, elongation and elasticity are very significantly increased. Dynamic modulus and heat build-up on flexing are decreased. Abrasion resistance, the collective result of all these effects, is greatly improved. In addition, internal viscosity in the vulcanizate is reduced to such an extent that, in a practical sense at least, both cure rate and flexibility, the oldest and most frequently encountered problems associated with the use of butyl products, cease to be sources of difficulty.

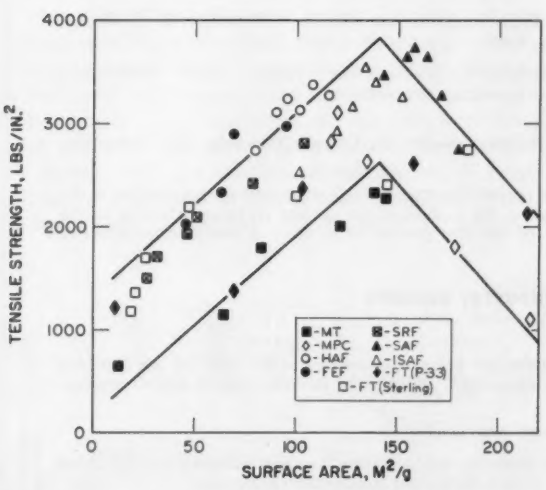

FIG. 15—Effect of surface area of selected blacks on tensile strength of butyl vulcanizates. The FT and MT blacks were attrited in a 17-gallon mill, all the others in a 1¼-gallon assay jar.

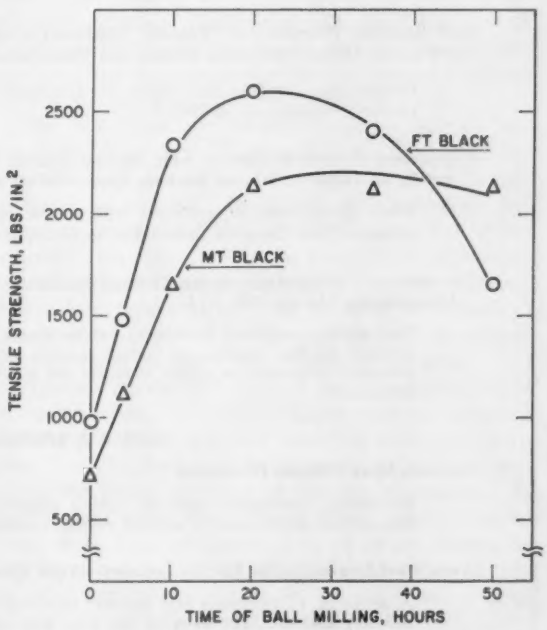

FIG. 16—Effect of ball milling time on tensile strength of butyl is given for compounds with FT and MT blacks ground in a 17-gallon ball mill.

The advantages of attrited blacks are related to physical and chemical changes in the blacks resulting from attrition. The breakage of aggregated carbon structure produces vulcanizates which have essentially the same extension modulus at a given black concentration, regardless of the surface area of the blacks. The chemical activation of attrited blacks yields a much more favorable carbon-polymer relationship than is obtained with untreated blacks. This chemical activation is attributed, at least in part, to increased numbers of free radical interactions on the part of the attrited blacks. Attrited blacks are referred to as "ultra" blacks which, like "ultra" accelerators, appear to be required if the best properties are to be obtained from a low unsaturation polymer like butyl.

ACKNOWLEDGMENT

The author acknowledges the assistance of J. C. Scarpa of Esso Research laboratories in carrying out the experimental work.

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Coming Soon . . .

Improved Butyl Rubber Vulcanizates—By C. J. Jankowski, K. W. Powers and R. L. Zapp, Enjay Laboratories, Linden, N. J.

How superior butyl rubber vulcanizates are obtained by replacing normal sulfur loading and accelerator with sulfur donor and low sulfur—high accelerator vulcanization systems.

Heat Resistant Properties of "Fluorel" Elastomer Under Extended Conditions—By D. A. Stivers, D. L. Peterson and G. R. Meier, Minnesota Mining and Manufacturing Co., St. Paul, Minn.

Recent data confirm the ability of fluorinated copolymers to withstand extreme heat, illustrated by property changes up to 700° F.

Engineering Factors in Coating with Silicone Rubber for High Temperatures—By H. I. Silversher, R. C. Shaffer and R. A. Landry, Western Backing Corp., Culver City, Calif.

When glass cloth is combined with a silicone compound, the resulting product derives mechanical strength from the glass in addition to flexibility and protection from the rubber.

The Role of Carbon Black in the Thermal Oxidation of Polyolefins—By W. Lincoln Hawkins, Bell Telephone Laboratories, Murray Hill, N. J.

The ability, exhibited by many carbon blacks, to inhibit the free radical oxidation of polyolefins is dependent on the presence of certain reactive groups on the surface of the carbon particles. Heating in the presence of oxygen or sulfur increases the number of reactive groups to produce a much more effective antioxidant.

PLUS R/A SPECIAL INDUSTRY REPORTS

Towards More Efficient Purchasing

Purchasing techniques used by rubber manufacturers are being re-examined in the light of the fact that the services performed by natural rubber, synthetic elastomers and plastics have multiplied and diversified.

Auto Fleet Leasing in the Rubber Industry—Your Questions Answered

A series of 12 questions and answers point up the extent to which leasing has been accepted by the rubber industry and spotlight some of the pros and cons of switching from company-owned fleets.

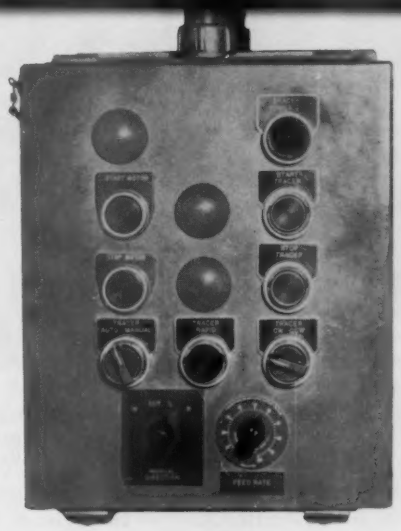

FIG. 1—Photograph of control panel shows three power switches, four tracer controls, a switch for manual operations and a feed rate control. In the "Auto" position the stylus follows the template. When the tracer is stopped, its drive clutches are disengaged permitting control of table by the spindle motor.

Electro-Mechanical Tracer System Simplifies Rubber Grinding

INSTALLATION of an electro-mechanical, two-dimensional tracer system has greatly simplified grinding of contoured rubber shells at Garlock Packing Co., Palmyra, N. Y., the world's largest manufacturer of packings and seals.

In operation the rough rubber forms are fitted over an aluminum mandrel on a large boring mill. Sizes of the rubber contours range up to 72 in. diameter x 72 in. long. The grinding wheel removes stock in accordance with signals received from the tracer stylus which maintains contact with the metal template. A tolerance of ± .005 in. must be maintained throughout the operation. When the rubber grinding operation has been completed, aluminum inserts are mounted into pre-formed openings in the rubber shell, then turned down flush with the rubber surface—once again in accordance with signals from the tracer template.

Garlock purchased the new electro-mechanical tracer from Seneca Falls Machine Co., after experiencing considerable difficulty with their original electro-hydraulic system because of its fragility. Any slight misalignment of contact points in the stylus due to dust or corrosion was automatically transmitted to the tool, and inaccuracies were inevitable. Because of the complexity of the equipment, service calls were frequent and very expensive—actually four during the first month, with the machine down 1½ to 2 days each time. Thus far there have been no failures with the new tracer equipment. There were, of course, a few minor "bugs" when it was first set up but they were corrected easily by incorporating the most recent stylus design. This excellent experience with the first electro-mechanical system at the Palmyra plant has led to the installation of two more.

The two-dimensional tracer system is electro-mechanically controlled and follows any contour around a 360-degree path at a constant speed, regardless of direction. The value of the cutting speed can be varied manually or can be controlled as a function of spindle speed to maintain a constant feed rate in inches per revolution of the spindle.

Electro-mechanical design simplifies the tracer mechanism and considerably reduces initial cost, as well as standard maintainance and repair requirements. According to the company, the cost of the electro-mechanical system was only about half that of the electro-hydraulic system. In addition, the old system required weekly checks by two specially trained men using test equipment itself costing $500.

The new tracer system incorporates a unique, patented rotating-eccentric stylus design. All critical assemblies have been eliminated and the need for adjustment is minimal. It is completely sealed and, therefore, unaffected by dirt and chips. The stylus assembly, on contact with the template, continuously feeds electrical signals to X and Y axes servo drives. These low power signals are boosted to actuate a "mechanical amplifier" which controls table movement for any value on the X and Y coordinate axes.

Another advanced feature of the new equipment is its variable speed potential. Rapid traverse approach from any angle is not only useful in reducing set-up time, but also facilitates locating-point check-out prior to the actual grinding or turning operations. In the Garlock application, tracing speed required varied from ¼ to 5 in. per minute with 15 in. per minute as the rapid rate. Tracing speed can be varied simply by adjusting the calibrated dial on the tracer control panel.

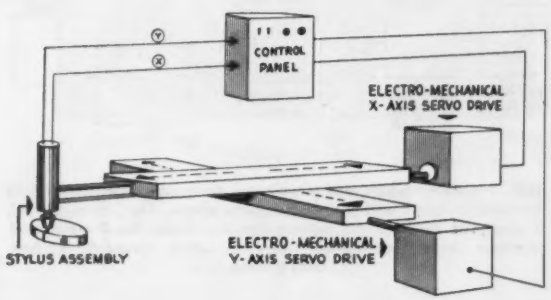

FIG. 2—The schematic diagram of the two-dimensional tracer system reveals how arrangement of its four main components simplifies rubber grinding.

Instrumenting Tire "Ride"

By M. BERGER and H. C. NORTH *Chemicals Research Div., Esso Research & Engineering Co., Linden, N. J.*

IN SEARCHING the literature concerned with properties of tires, one is struck with the lack of information on the "ride" of tires. This is particularly surprising since the primary reason for putting tires on vehicles is to absorb shock. A major difficulty in this respect is evaluation. "Ride" is primarily a subjective measurement and not easily amenable to quantitative measurement.

The present paper describes a method for precise measurement of tire ride. We feel that an instrument for this purpose is a necessary adjunct to the other fine equipment recently developed to measure tire characteristics. Ride measurements permit data analysis that may lead to an understanding of the factors involved in the superior ride of one type of tire. Improvements in stability, wear, power consumption, etc., are often made at the expense of ride. A quantitative measure would indicate how much ride is sacrificed with an improvement in the above factors and thus help establish a suitable compromise, if such is required.

The basic question in this problem is "What does an individual 'feel' when his car goes over road irregularities?" It would appear that the variable most descriptive of human disturbance in a vehicle is the rate of change of the vertical force or acceleration. Den Hartog *(1)* has this to say: "Assuming that the car is moving forward at a constant speed, what quality should be considered to be a measure of comfort?

"It might be the vertical displacement of the chassis or any of its derivatives. It is not the vertical amplitude itself, for a ride over a mountain being a 'vibration' of amplitude 3,000 feet at the rate of 1 cycle per hour may be very comfortable. It is not the vertical velocity, for there are no objections to a fast ride up a steep slope. Nor is it the vertical acceleration, for this is a steady force which amounts only to an apparent change in 'g' that cannot be felt. But sudden shocks produce uncomfortable sensations, therefore a criterion for comfort is the rate of change of acceleration $\frac{dg}{dt}$, a quantity that has been called 'the jerk'."

With the above in mind, we set about building a "ride" meter.

Since primary interest centered on the tire, it was felt that the best place to measure "the jerk" was at the front wheel spindle, on the assumption that any difference in jerk at the wheel would be detected by the passenger as discomfort. The most obvious method of measuring the vertical rate of change of acceleration appeared to be with an accelerometer and an electrical differentiating circuit. Hence, a crystal accelerometer (Endevco) was placed on the right front wheel spindle to sense vertical acceleration. The output the accelerometer was fed to an R-C differentiating circuit and the resultant signal displayed on a cathode ray oscilloscope. The car was then driven over a 2 x 4 and the scope-picture photographed.

This technique was unsatisfactory for a number of reasons: (1) It was very difficult to repeat results. Angle of approach and car acceleration appeared to influence the signal. (2) Synchronization with the

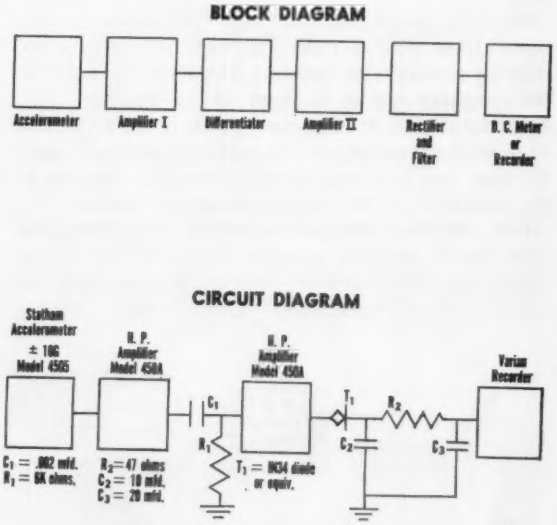

FIG. 1—Meter which was developed to gauge ride qualities is outlined in block and circuit diagrams above. The "Amplifier II" is designed for zero d-c output; the d-c meter for 2 megs, and minimum input impedance. A strip chart recorder registers output data.

scope sweep proved a difficult problem. (3) Most important, tires of known different ride qualities felt the same to the occupants during this test.

The next approach was to try to record "the jerk" over a sizable stretch of road. Subjectively, differences were noted between tires. However, this technique still posed serious instrumentation problems: (1) The oscilloscope had to be instrumented so that its sweep was slow enough to encompass a reasonably long stretch of road. This led to problems in taking photographs. (2) The signal was very "hashy" and difficult to interpret. (3) Strip chart recorders eliminated the photographic problem, but their frequency response was too slow to follow the signal faithfully.

These difficulties were resolved by designing an instrument which recorded the peak values rather than the instantaneous values of "the jerk." This gave an essentially d-c signal which could conveniently be recorded on a strip chart recorder. The block and circuit diagrams of this instrument are shown in Figure 1. Figure 2 shows its frequency response. Of course, the characteristics of this curve can be changed by changing appropriate circuit constants.

Using the Perfected Device

To test a tire, we travel at constant speed over a predetermined distance of road. The output of the instrument is recorded on a strip chart recorder. The distance chosen is approximately a mile. The area under the output curve is measured. This gives a number which represents the average peak value of "jerk" over the test distance. This number is designated as the ride index. The higher the ride index, the poorer the ride. The ride meter is sensitive enough so that evaluations can be made on practically smooth roads.

It should be mentioned that under severe acceleration or braking conditions, spurious signals can interfere with the measurement. These are due to the engine and to the down dip from braking. Under constant velocity conditions, however, these effects are negligible.

In tests run with a series of tires, the correlation between ride, as judged subjectively, and ride index was very good. Such data are not presented here because of the difficulty of giving numerical values to the subjective ratings.

Figure 3 shows the ride index for butyl and styrene rubber tires at a series of inflations. These tires were 7.50-14 in size, and the test carried out at 30 miles per hour. The data for Figure 3 were obtained on a relatively rough road and on a smooth road. Both roads had expansion joints. As can be seen from these curves, the butyl tires are considerably better than their styrene rubber counterparts—the differences being greater at higher inflations and on the smoother road. Both of these observations indicate that butyl tires show to best advantage under road and operating conditions which do not severely distort their carcasses.

This method of evaluating tire ride does not completely replace the human "ride man." What it does do is give him a quantitative aid. We think that this device will be particularly valuable in evaluating new polymers and designs and their effect on tire ride.

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Frequency Response Curve

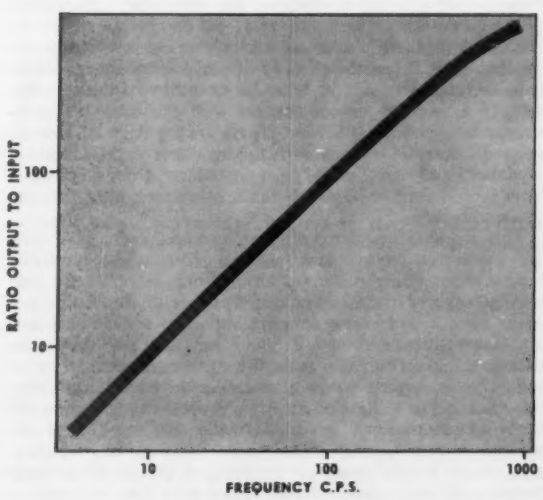


FIG. 2—Extreme sensitivity is one of the requirements for an instrument objectifying passenger comfort. The meter described by the authors forms this frequency response curve, with 2 amplifiers at 40 db gain; E in $= 2.1 \times 10^{-3}$ volts (p to p), and $R_1C_1 = 1.2 \times 10^{-3}$.

Ride Index Data

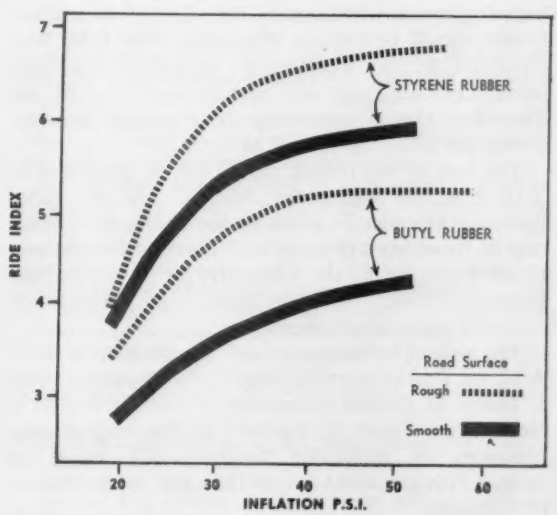


FIG. 3—The new meter gave these ride index values for butyl and styrene rubber tires tested at various inflations on rough and smooth roads. Butyl tires gave a better ride, their margin being greatest at higher inflations as well as on the smoother surface.

A.C.S. Rubber Division Meets in Buffalo May 4 to 6

THE 77th meeting of the Division of Rubber Chemistry of the American Chemical Society will be held on May 4, 5 and 6 at the Statler Hilton Hotel in Buffalo, N. Y. The three-day meeting will feature the presentation of 16 technical papers, 2 invited papers, and the Charles Goodyear Medal Lecture. Other activities of interest will include a luncheon meeting of the 25-Year Club, a business meeting and the divisional banquet.

The technical program for the meeting has been divided into four sessions. The first of these sessions will be held on Wednesday afternoon, May 4, with Division Chairman W. J. Sparks (Esso Research) presiding. On Thursday morning, May 5, the second session will be held under the chairmanship of W. S. Coe (U.S. Rubber), vice-chairman of the Rubber Division. Past-chairman E. H. Krismann (DuPont), will preside over the third technical session scheduled to be held on the afternoon of Thursday, May 5. The final technical session will be held on Friday morning, May 6, with L. J. Halpin (Dunlop Rubber) presiding.

Mr. Halpin, incidentally, is also serving as chairman of the Local Arrangements Committee for the meeting. Mr. Halpin reports that a program of activities has been arranged for the ladies in attendance, including a visit to Niagara Falls. The 25-Year Club Luncheon will be held on Wednesday with J. M. Ball (Midwest Rubber Reclaiming) presiding. The Suppliers' Cocktail Party will be held at 6:00 P.M. on Thursday, May 5, preceding the divisional banquet which will follow at 7:30 P.M.

The first of two invited papers will be presented at 2:10 P.M. on Wednesday, May 4. At this time, Professor Herman F. Mark of the Polytechnic Institute of Brooklyn will speak on "Latest Advances and Break-Throughs in the Chemistry of Polymers and Polymerizations." Professor Mark is an international authority on polymer chemistry.

The second invited paper will be presented at 9:10 A.M. on Friday morning, May 6, by Professor Peter J. Debye of Cornell University. Professor Debye, a Nobel Prize winner in chemistry for his original contributions on molecular structure, will speak on "Latest Advances and Break-Throughs in the Physics of Polymers."

The 1960 Goodyear Medalist, W. B. Wiegand (Columbian Carbon—retired), will deliver the Charles Goodyear Medal Lecture on Thursday morning, May 5, at 11:10 A.M. He has chosen as his topic, "Determinants in Research". The presentation of the Charles Goodyear Medal will be made at the divisional banquet, Thursday evening, May 5. A complete biography of Dr. Wiegand appears in the December, 1959, issue of this journal.

Abstracts of the technical papers to be presented at the meeting follow:

Wednesday Afternoon—May 4

W. J. Sparks, Presiding

2:00 P.M.—1—Introductory Remarks and Introduction of Professor Mark. ***W. J. Sparks, Division Chairman.***

2:10 P.M.—2—Latest Advances and Break-Throughs in the Chemistry of Polymers and Polymerization. ***Herman F. Mark (Brooklyn Polytechnic Institute, Brooklyn, N.Y.).***

No abstract available.

3:10 P.M.—3—Low Temperature Rheology of Silicone Elastomers. ***D. B. Braun (Silicones Division, Union Carbide Corp., Tonawanda, N.Y.)***

In order to extend the knowledge of the low temperature behavior of silicone elastomers, the previously unexplored interrelationship of exposure time and temperature was investigated with emphasis on the effects of prolonged exposures. In addition, the effect of polymer architecture, known to govern the area of low temperature utility of these elastomers, was studied in conjunction with the exposure time-temperature variables. Several representative types of silicone polymers were investigated, including conventional dimethyl siloxanes; polymers with polar, pendant groups; physical blends of these two; and siloxanes containing intra-polymer chain stiffeners.

This work shows that, although short-term exposure tests are useful for control and selection work, a more reliable indication of utility is derived from prolonged exposure tests over a range of low temperatures. Polymer crystallization can occur over a wide range causing stiffening of the elastomer at temperatures well above those indicated by short-term exposure tests. Polymer structure determines the area of utility by governing temperature range in which crystallization can occur. The presence, in proper concentration, of bulky pendant groups or intra-polymer chain stiffeners, introduced by copolymerization, tends to lower this temperature range. Incorporation of the pendant groups by polymer blending is much less efficient in lowering the temperature range of crystallization.

This work affords further insight into the behavior of silicones at low temperatures and represents a valuable aid in the design of future low temperature silicone polymers. In addition, it furnishes the design engineer with a reliable

indication of the low temperature capabilities of the various types of silicones, enabling him to select that material which best fits his needs.

3:30 P.M.—4—Radiation-Induced Compression Set on Elastomeric Compounds. ***E. E. Mooney and S. T. Semegen (B. F. Goodrich Research Center, Brecksville, Ohio). (Paper will be presented by Mr. Mooney.)***

Gamma radiation damage on elastomeric compounds under compression has been studied using compression set measurements. Irradiation was conducted in air and alkyl diphenyl ether at room temperature. All compound evaluations were made with and without potential radiation damage inhibitors (antirads). CR, NBR, and SBR rubbers were formulated as either aircraft hose, seals, fuel cells or wire insulation. Other elastomers were tested in standard test recipes. The importance of equivalent cure is emphasized. Graphs of percentage compression set versus radiation dose are used for evaluation of radiation resistance. Compression set is satisfactorily computed using a calculation which adequately corrects for pre-irradiation set. Based on radiation dose required to effect 50 per cent compression set (at room temperature in air) the order of radiation resistance of control elastomeric compounds investigated is:

SBR > NBR > NR > CR > Hypalon 20 > Hycar 4021 > Viton A > Thiokol ST > Thiokol FA.

These compounds (with or without antirads) are rated on the basis of the highest dose required for 50 per cent compression set, as follows:

NBR > Hycar 4021 > SBR > CR > NR > Hypalon 20 > Viton A > Thiokol ST > Thiokol FA.

An attempt has been made to develop an empirical mathematical relationship which fits radiation compression set data.

3:50 P.M.—5—Oil Migration Study. ***Frank Kadlec and Ray Thoman (Gates Rubber Co., Denver, Colo.). (Paper will be presented by Mr. Kadlec.)***

The purpose of this study was to establish that oils tend to migrate from oil extended stocks into oil free stocks or stocks containing a limited amount of oil, and to develop a method of measuring this oil migration. Both objectives were accomplished. Data is presented showing the variation in oil present in stocks by means of acetone extract. Photographs under ultraviolet light, an original method, visually confirm data obtained by use of acetone extract. Data and photographs are presented of cured test samples aged on the shelf, in a hot air oven, and up to 360 days on the roof. Also included are data on oil migration between two uncured stocks after shelf and heat aging. It is shown that the tendency of oil to migrate is reduced when even a small amount of oil is present in the other component stock. Further work presently under way, such as the effect of oil migration on adhesion, migration of curatives and aging inhibitors, and possible means of reducing or preventing oil migration is outlined.

4:10 P.M.—6—Viscosity Control in Butyl Latex. ***Alfred L. Miller (Chemicals Research Division, Esso Research & Engineering Co., Linden, N. J.).***

The unusual chemical stability of Butyl Latex MD-600-55 makes possible the adjustment of its viscosity, increase or decrease, by a novel technique. By the appropriate addition of a wide variety of salts the viscosity of Butyl Latex MD-600-55 can be more than doubled or reduced, to about one fifth of the original value, as required, with only negligible dilution. By this means, the viscosity of butyl latex can be drastically reduced before heat concentration to result in a latex of high solids (65-70 per cent) with usefully low finished viscosity. The salt additives do not produce instability and do not interfere with cure. In the case of ammonium or amine salts, cure is actually improved. This process does not appear to be concerned with particle coalescence but does depend upon the reactions of dissolved emulsifier. Data to support this view are presented.

Program of the

DIVISION OF RUBBER CHEMISTRY
AMERICAN CHEMICAL SOCIETY

Statler Hilton Hotel, Buffalo, N. Y.
May 4-6, 1960

Wednesday Morning — May 4

9:00 A.M.—Registration.
11:30 A.M.—Twenty-Five Year Club Luncheon, J. M. Ball, Chairman.

Wednesday Afternoon — May 4

2:00 P.M.—Technical Session.

Thursday Morning — May 5

9:00 A.M.—Technical Session.
11:00 A.M.—Business Meeting.
11:10 A.M.—Charles Goodyear Medal Lecture by Dr. W. B. Wiegand.

Thursday Afternoon — May 5

2:00 P.M.—Technical Session.

Thursday Evening — May 5

6:00 P.M.—Suppliers' Cocktail Party.
7:30 P.M.—Divisional Banquet.

Friday Morning — May 6

9:00 A.M.—Technical Session.

Thursday Morning—May 5

W. S. Coe, Presiding

9:00 A.M.—7—The Reaction of Dicumyl Peroxide with Dimethyloctadiene. Determination of the Cross-Linking Efficiency. ***C. R. Parks and O. Lorenz (Research Division, Goodyear Tire & Rubber Co., Akron, Ohio). (Paper will be presented by Mr. Parks.)***

The cross-linking efficiency of dicumyl peroxide (DCP) was investigated using 2,6-dimethyl-2,6-octadiene (DMOD) as a model olefin. One of the difficulties encountered in making cross-linking measurements on even simple systems such as the one above is to find an analytical method that is both rapid and reliable. Most chemical methods for analyzing the reaction products are laborious and inconsistent. High temperature gas phase chromatography offers a solution to some of the complex analytical problems encountered in this type of work. The amount of cross-linked product from the reaction of dicumyl peroxide with dimethyl octadiene could be followed readily by means of the chromatograph.

It was found that the yield of cross-linked product approached 100 per cent in the investigated temperature range of 120° to 150°C. This means that one cross-link has been formed for each molecule of peroxide decomposed. This was true only when a molar ratio of DMOD:DCP = 20:1 or above was used. When larger amounts of peroxide were used, less than theoretical yields were found. The cross-linked product was found to be almost exclusively dimer (above a ratio of 20:1). Kinetic data were obtained to show that the cross-linking reaction followed a first order law. The activation energy was found to be 32 kcal/mole.

9:30 A.M.—8—Studies in the Measurement of Unsaturation in Butyl Rubber. ***I. J. Gardner and S. B. Robison (Chemicals Research Division, Esso Research & Engineering Co., Linden, N. J.). (Paper will be presented by Mr. Gardner.)***

The commercial importance of butyl rubber as a vulcanizable elastomer is resident in a minor concentration of isoprene in the polymer. Many techniques of analysis for this constituent have been examined. Unsaturation measurements

by ozonolysis, which are based on the decrease in molecular weight of the polymer on exposure of a solution of the polymer to ozone, have afforded values only about 60 per cent of the results obtained with chemical and isoprene Carbon-14 labeling techniques. The possibility of the formation of polymeric ozonides contributing to this variance has been explored. The effects are presented of a number of potential ozonide terminating agents on the limiting viscosity average molecular weight obtained on exposure to ozone. Particular attention is given to mercaptans and the effects of their structure.

10:00 A.M.—9—The Correlation of the Reactivity of Magnesium Oxide with Its Performance as a Process and Curing Aid for Elastomers. ***Richard A. Patton (Morton Chemical Co., Woodstock, Ill.).***

The variable performance of magnesium oxide as an elastomer process and curing aid has plagued compounders for many years. Variations have been observed not only between "equivalent" grades from different manufacturers but also between different lots from the same manufacturer. This study was undertaken to determine whether performance characteristics could be related to a readily measurable yardstick of reactivity. It was found that the extent to which magnesium oxide chemisorbs iodine is a measure of the rate at which magnesium oxide will react with the acidic decomposition products of elastomers like neoprene, Hypalon, Viton, Fluorel and chlorobutyl rubber. This is deduced from the excellent correlations of iodine numbers with Mooney Scorch Times obtained for these elastomers. It was also found that rates of cure and states of cure correlate with this same property. Reflecting differences in function, it was also found that correlations for different elastomers possess quite different characteristics. For example, highly reactive oxides provide the maximum process safety with the neoprenes and the least for Hypalon.

While control of this magnesium oxide property cannot eliminate polymer variations, this control can certainly minimize the rubber compounder's problems. Elimination of variability in the performance of the magnesium oxide is a step in the direction of more scientific compounding.

10:20 A.M.—10—Effect of Amine Structure on Properties of Cured Polyurethane. ***Arthur J. Sampson and C. F. Blaich, Jr. (Sales Application Laboratory, Carwin Co., North Haven, Conn.). (Paper will be presented by Mr. Sampson.)***

It has been found that amine curing agents with inherent chemical rigidity will produce elastomers of outstanding properties. It is well known that amine curing agents impart outstanding properties to cured urethanes. In a recent program to determine the effect of amine structure on urethane properties, 3,3′-dichlorobenzidine, o-tolidine, dianisidine, methylene bis(o-chloroaniline). diaminodiphenylsulfone, methylene bis(4 phenylamine), and polymethylene polyphenylamine have been evaluated as potential curing agents for commercially available urethane polymers. These curatives have also been evaluated with prepolymers of known composition. 3,3′-dichlorobenzidine (DCB) imparts extremely high modulus and better solvent resistance to urethanes. It also yields extended pot life but reduced cure time. The effect of cure conditions is discussed with emphasis on the outstanding adaptability of DCB to plant operation.

For applications in which automatic mixing equipment is available and quick set time is desired, the use of methylene bis (4 phenylamine) (MDA), and polymethylene polyphenylamine (PAPA) is reviewed. It has been found that the polymeric structure of PAPA provides improved properties over other fast-curing amines such as MDA. Tolidine and dianisidine can also be used to obtain shorter set time while enjoying the high properties inherent in the benzidine structure. The paper is of general interest since it discusses the relationship of molecular structure of the curing agent to the properties of the cured urethane. Because of the recent interest in the possible carcenogenic activity of DCB, the health hazards of amines are reviewed, American and Russian work reviewed, and references given.

11:00 A.M.—Business Meeting

11:10 A.M.—Determinants in Research. ***W. B. Wiegand, Charles Goodyear Medalist.***

No abstract available.

Thursday Afternoon—May 5

E. H. Krismann, Presiding

2:00 P.M.—11—Factors Influencing the Ozone Resistance and Physical Properties of NBR Vulcanizates Modified with PVC Resins. ***W. A. Wilson (Goodyear Tire & Rubber Co., Akron, Ohio).***

Protection of NBR vulcanizates against ozone attack by modification with PVC resins has been previously reported. However, several variables in compounding and mixing techniques may have a direct influence on the degree of ozone resistance and the physical properties which can be obtained. Adequate fluxing of the NBR/PVC blend is essential for optimum physical properties and ozone resistance. Fluxing temperatures vary with the average effective inherent viscosities of the PVC resins and the mode of mixing. Typical fluxing temperatures for various PVC resins with NBR polymers are listed. NBR polymers of low acrylonitrile content blended with PVC resin have poorer ozone resistance than NBR polymers containing higher acrylonitrile content.

Lower molecular weight PVC resins as indicated by inherent viscosities also do not have as good ozone resistance as those of higher viscosities when blended with NBR polymers. Emphasis is also placed on the effects of pigmentation with various carbon blacks and light colored pigments, and various plasticizers. Oil and fuel resistant compounds with excellent ozone resistance may be obtained by proper choice of an NBR polymer and PVC resin blend which has been adequately fluxed. Applications may include fuel hose jackets, cable jackets, shoe soling and conveyor belt covers.

2:30 P.M.—12—Factors Affecting the Weather Resistance of Hypalon Chlorosulfonated Polyethylene. ***P. A. Peffer, Jr., and R. R. Radcliff (Elastomer Chemicals Dept., E. I. du Pont de Nemours & Co., Wilmington, Del.). (Paper will be presented by Mr. Peffer.)***

The outstanding weather resistance of Hypalon chlorosulfonated polyethylene vulcanizates is largely responsible for their use by the rubber industry in such applications as white sidewalls, garden hose, coated fabrics and coated sponge; and by the paint industry in exterior maintenance paints. However, because changes in Hypalon take place slowly during exposure, the relationships between compounding variations and performance during aging have not been clearly defined. This paper will present an interpretation of data concerning these factors with the objectives of broadening compounding technology and forming a basis for further investigations in this field. The following topics are discussed: (1) A comparison of present Hypalon polymers is shown. Data indicate that stability decreases in the following order: Hypalon 40 > Hypalon 20 > Hypalon 30; (2) Pigments are shown to be essential ingredients in compounding for outdoor durability. Vulcanizates containing optimum amounts of stable, ultraviolet light absorbing white or color pigments approach those containing carbon black in durability. Pigment requirements are shown to be more critical as the thickness of the exposed specimen decreases because a larger percentage of the cross-sectional thickness is exposed to ultra-violet radiation.

(3) Vulcanizates containing fillers, which are essentially transparent to ultra-violet light, show wide variations in chalk resistance. Whiting, a poor filler for most elastomers, imparts excellent chalk resistance to vulcanizates at relatively high concentrations, whereas clay chalks at concentrations as low as 20 volumes; (4) In compounds cured with magnesia, the concentration strongly influences the rate of change of stress-strain properties during exposure, but does not affect the rate of change in surface characteristics. Tri-basic lead

maleate has an opposing effect. Its concentration shows a strong relationship with changes in surface characteristics during exposure but only slightly affects the rate of change of stress-strain properties. Quite unexpectedly, phenolic antioxidants minimize the changes which occur when the concentration of tri-basic lead maleate is varied.

2:50 P.M.—13—Lignite Tar Fractions as Antioxidants and Plasticizers for Rubber. ***R. A. Clark and W. J. Mueller (Battelle Memorial Institute, Columbus, Ohio). (Paper will be presented by Mr. Clark.)***

Studies were made to discover potential applications for lignite tar fractions in rubber. The materials investigated were produced from low-temperature lignite tar by dual solvent extraction (aqueous methanol and hexane) and distillation procedures (*Ind. Eng. Chem. 52,* 131 (1960). High boiling methanol solubles (HBMS), which consist predominantly of derivatives of phenol, were found to have antioxidant properties in rubber fully comparable to those of phenyl-beta-naphthyl-amine. Hexane soluble residue (HSR), which is both an effective antioxidant and a plasticizer, can be blended with HBMS to obtain an optimum balance of aged rubber physical properties. While the majority of the investigation was conducted with SBR-1500, studies also revealed similar effects in natural rubber, butadiene-acrylonitrile copolymers, and neoprene.

3:10 P.M.—14—A New, Safe-Processing, Fast-Curing Fluorocarbon Elastomer. ***D. L. Peterson and D. A. Stivers (Minnesota Mining & Manufacturing Co., St. Paul, Minn.). (Paper will be presented by Mr. Peterson.)***

One of the major problems during fabrication of fluorocarbon elastomers is processing safety, or if safety is obtained, development of a fast cure and the achievement of optimum heat resistance and compression set properties.

The vulcanization of copolymers of vinylidene fluoride and hexafluoropropylene with hexamethylene diamine carbamate (HMDA-C) is typical of this problem. When cured with HMDA-C, Fluorel KX-2141 vulcanizates possess the heat, fluid, and compression set properties of Fluorel brand elastomer, while uncured compounds have fast rates of press cure (10 to 20 minutes at 300° to 350°F.) and good safety against scorching during processing (MS 250°F., 17 to 30 minutes to 10 point rise). This paper describes physical properties and compound variations made with this new elastomer in the development of specification compounds and compounds for resistance to compression set and extended aging at high temperatures (400° to 700°F.).

3:30 P.M.—15—Zinc Oxide Quality Control with the Direct Reading Spectrometer. ***J. H. Kanzelmeyer (Zinc Smelting Division, St. Joseph Lead Co., Monaca, Penna.)***

An important aspect of zinc oxide quality control is determination of trace elements. The Direct Reading Spectrometer has provided a rapid and accurate method for analysis of zinc oxide for iron, lead, cadmium, silicon, manganese, copper, indium, and aluminum. As many as ten samples per hour can be analyzed for these eight elements at a cost of about $.15 per determination, a figure far below that of conventional methods. The coefficient of variation is less than 10 per cent for all elements. A brief description of the instrument and its operation is given and the procedure used and problems encountered in developing the method are discussed.

Friday Morning—May 6

L. J. Halpin, Presiding

9:00 A.M.—16—Introduction of Professor Debye, ***W. J. Sparks.***

9:10 A.M.—17—Latest Adances and Break-Throughs in the Physics of Polymers. ***Peter J. Debye (Baker Laboratory, Cornell University, Ithaca, N. Y.).***

No abstract available.

10:10 A.M.—18—Organo-Tin Molecular Sieve—A Latent Catalyst for Rigid Polyurethane Foams. ***J. E. Schmidt, F. M. O'Connor and R. L. Mays (Linde Co., Tonawanda, N. Y.). (Paper will be presented by Mr. Schmidt.)***

Rigid polyurethane foams are becoming more important as insulating and structural reinforcing materials. The polyols and polyisocyanates used in preparing these foams are sufficiently active in the absence of a catalyst to cause polymerization, but at a relatively slow rate. In order to obtain practical polymerization rates and high quality foams, catalysts are used. A finite induction period is desirable to provide sufficient time for adequate mixing and to perform other necessary handling operations. The use of rigid polyurethane foams for foamed-in-place applications has greatly emphasized the need for delayed action catalyst systems.

Certain organo-tin compounds have been found to be more active catalysts than many of the commonly used amine compounds and have made possible the production of high quality foams by the "one-shot" method. The initiation of the foaming reaction catalyzed by the organo-tin compounds can be appreciably delayed by introducing these catalysts loaded on Molecular Sieve. The catalyst remains isolated during the induction period. Release is effected by both the displacing action of polar compounds in the formulation and the heat evolved by the exothermic reaction.

Chemical-Loaded Molecular Sieve (CW-4107), an organo-tin compound-loaded Molecular Sieve, provides a longer induction period along with a very fast polymerization rate. This paper presents data which show the utility of this catalyst system in formulations of the "one-shot" and "prepolymer" types for both water-blown and fluorocarbon-blown foams.

10:40 A.M.—19—Oxidations and Reductions at the Carbon Black Particle Surface. ***Andries Voet and Archie C. Teter (J. M. Huber Corp., Borger, Texas). (Paper will be presented by Mr. Voet.)***

It has become more and more apparent that the outstanding properties of carbon blacks as reinforcing pigments for elastomers are not only connected with physical effects, but depend for an important part on chemical interactions at the particle boundary. The reactive groups are of quinone and hydroquinone character. In this investigation, a new practical method is given for the rapid quantitative determination of the concentration of these groups on the carbon black surface. In addition, a new approach to the condition of the quinone-hydroquinone equilibrium on the particle surface has been indicated by means of redox potential measurements of aqueous carbon black dispersions.

Finally, the intensity of the binding of oxygen by various types of carbon black was investigated by measuring oxygen release upon subjection to successively higher temperatures, up to 1200°C. Accurate data were obtained by means of a direct micro method for the determination of oxygen in carbon blacks.

11:10 A.M. — 20 — Diene Rubber — Compounding and Testing. ***W. A. Smith and J. M. Willis (Chemical and Physical Research Laboratories, Firestone Tire & Rubber Co., Akron, Ohio). (Paper will be presented by Mr. Smith.)***

Diene rubber, a polybutadiene polymerized in solution with alkyl lithium catalyst, has been extensively evaluated in both laboratory and tire tests. Stocks with outstanding properties have been developed by blending with either natural rubber or SBR. Diene rubber in tire treads and body stocks leads to improved wear and cracking resistance, lower operating temperature, reduced rolling resistance, better high speed performance, and increased traction on snow. Polybutadienes made with catalyst systems other than alkyl lithium gave no better performance than Diene rubber in tire service.

SPECIAL INDUSTRY REPORT

How to Select Your New Plant Site

► AMERICAN industry today might truly be described as industry on the move. It is estimated in some industries that as much as 10 per cent of total manufacturing and distribution costs are affected by geographical factors. Managements of both large and small rubber concerns are taking a second look at their plant locations and investigating new sites for more profitable operations.

Five of the more common reasons for this wave of expansion and relocation of industrial operations are: shifting markets; steadily mounting freight costs; the need for new labor pools; desire to operate in smaller low-cost communities, and requirements for new straight line production facilities.

The selection of a new plant site has become an exacting science. No longer can the rubber manufacturer locate a new plant by sheer whim or intuition; and he can no longer consider automatic expansion of present locations simply because they were chosen 50 years before. Hit or miss plant locations often result in costly penalties.

The largest single issue, then, which faces any management when considering plant expansion is "Where?" But even more crucial is "How?" How does a manufacturer—large or small—choose the right location for his new plant? Furthermore, what services are available to his industry to assist him in the selection of a plant site?

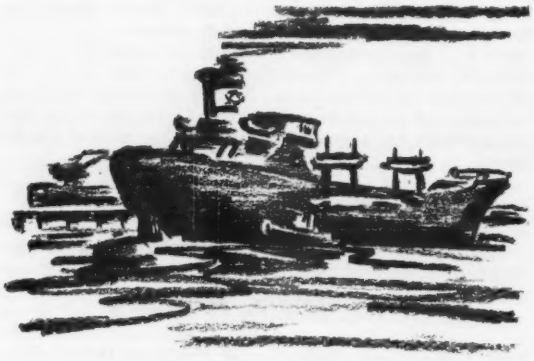
Sites Must Suit Many Needs

There is no single answer or formula which will determine the selection of a successful and profitable plant location, nor are there conventional rules of procedure. Each manufacturer has basic requirements which are relevant to his particular operation. He must treat his site selection as an individual case. Therefore, choice of a plant site should start with a check list of the manufacturer's specific needs. There are many variables involved. Generally speaking, rubber industries are somewhat limited in their site selection because they have specialized requirements.

Rubber operations must be located very close to boat transportation, thus ruling out all sites except those which can guarantee this mode of transportation. Another requirement is a large amount of semi-skilled and unskilled labor. This limits the number of sites even further. A third requirement is a specialized building which, in most cases, must be constructed to the manufacturer's specifications. On the other hand, plant expansion may be required for production of newly developed products. Or, perhaps existing facilities are outmoded and the new plant must provide savings in operating costs.

The ideal rubber site...

...should have boat access



√ Management's check list of site selection factors:

- Proximity to markets
- Proximity to raw materials
- Labor supply
- Labor potential
- Labor force patterns
- Labor legislation
- Water supply
- Utilities
- Motor transportation
- Commercial air service
- Rail service
- Housing
- Schools
- Cost of living
- Recreational facilities
- Neighboring industries
- Size of available sites
- Vacant buildings
- Expansion possibilities
- Land and building costs
- Sewage disposal facilities
- Attractiveness of community as place to work and live
- Mail, parcel post and express
- Communications
- State legislation
- State taxes
- Local taxes and legislation
- Future taxes
- Financial arrangements
- Zoning
- Climate
- Size of community
- Community attitudes

The rubber industry, in most cases, is not affected by many of the general locational factors common to other industries. These include power and fuel costs, skilled labor supply, and closeness to raw materials and markets.

A common requirement basic to almost every industry is a site which will permit the most economical accumulation of raw materials and services, processing, and distribution of finished products. The ideal is one where the total of these costs is the lowest and where the industry is compatible with the community. Naturally, costs will vary from location to location. To evaluate areas of consideration effectively, current operating costs should be charted for comparison against estimated expenses at future sites. The following items offer a simple guide for listing such expenses: transportation, labor, general plant operating expense, utilities, taxes, and miscellaneous items.

Groups Offer Free Counsel

Once a definition of specific needs has been arrived at, the task of selecting a geographical area for new plant location will be greatly simplified. After a general geographical area has been chosen, a wealth of plant location services are available to manufacturers to assist in the logical selection of a specific community and site. Private development corporations, chambers of commerce, industrial real estate firms and local governments offer assistance in the selection of a site. However, these services in most instances deal only with local communities and areas.

Encompassing larger areas of interest are state governments, railroads and utility corporations who probably offer the most complete plant location services. These groups work in close cooperation with the local development groups in their service to industry. In almost every case there is no cost or obligation for this assistance.

A typical example of a utility corporation which offers plant location services is the Niagara Mohawk Power Corporation. This utility has a special department devoted solely to area and industrial development and offers a comprehensive list of free plant location services. As a supplement to basic plant location material, it provides tailor-made analyses of specific sites, communities and factors. A folder entitled "At Your Command," outlining these services, is available to industrial executives by writing Niagara Mohawk at 310 Erie Boulevard West, Syracuse, N. Y. Another publication sent by the company on request is "Upstate New York," a 28-page booklet listing the advantages of this particular region for industrial location. It discusses such topics as consumer markets, world markets, research facilities, manufacuring expansion, transportation, industrial gas and electric power.

Location Questions & Answers

Essential to the manufacturer considering a new plant location are financing arrangements. Would your business be in a better position financially by leasing or buying a building? What about a purchase lease-back? Is a new building necessary or should existing structures be considered? Is mortgage money available? Because of a utility's intimate knowledge of the communities it serves, it is able to put you in touch with the best financial sources available.

Assembled here, in brief, are ten valuable hints which can be used in your site selection: (1) Define the specific requirements for your industry before investigating areas. (2) Make careful and critical analyses of all such findings. (3) Double-check long range power supplies. Factors to be considered when evaluating the power situation of an area are: (a) Reliability of power service—lack of power interruptions; (b) Type of generation, whether hydro, steam or other; (c) Long range power supplies; (d) Rates.

(4) Carefully evaluate the community and the attitudes of its people. These are the individuals who will comprise your labor force. (5) Double-check long range water supplies and waste disposal. (6) Compute freight transportation rates (i.e., water, rail and motor). (7) Check services offered by state and local governments.

(8) Give careful consideration to such factors as general business climate, schools, housing and community facilities. (9) Bear in mind that educational and recreational facilities will have a strong pull on key personnel. (10) Do not overlook the exceptionally fine outside sources of free information and assistance.

EDITORIAL

The Resiliency of the Industry

► All of us have heard from time to time the "humorous" references to the rubber industry as being "bouncy" or "stretchy" and even "resilient." The thought occurs that we are literally all these things and the humor has a point in truth. The rubber industry is rather a startling entity when one thinks about it.

During the past few months several major rubber producers have discontinued or curbed the manufacture of latex foam rubber products to concentrate more heavily upon polyurethane foam. In this particular case the economics of the situation dictated the move coupled with the fact that the polyurethane foam segment has been meeting with greater consumer approval and acceptance for all cushioned products.

Several years ago, rubber manufacturers were discontinuing the manufacture of rubber toys and concentrating upon vinyl toys. And this too represented a major step for the industry.

What we mean to point out is the incomparable ability of the rubber industry to absorb new polymers, new techniques—to resolve the difficulties involved—and to come up on both feet.

Offhand, we can think of no other industry in the United States or throughout the world for that matter which has this adaptability, yes, this resiliency. Let the jokesters have their little laughs, we should be proud of our more "bounce to the ounce".

The problems currently besetting the industry—particularly the problems involved with the real or potential loss of overseas markets will, we are certain, be solved by the ingenuity the industry has so far exhibited in meeting other situations.

Tire Fatigue Failures Discussed at TAPPI Meeting

► Results of research which refutes the theory that tire fatigue failure is caused by a gradual loss of cord strength proportional to tire mileage, were reported at the February 24 meeting of the Technical Association of the Pulp and Paper Industry at the Hotel Commodore in New York City. A paper prepared by W. G. Klein, Dr. M. M. Platt and Dr. W. J. Hamburger of Fabric Research Laboratories, Inc., Dedham, Mass., states that fatigue failure is charactertized by circumferential cracks in the regions of maximum cord flexing. Mr. Klein, who presented the paper, said that fatigue, defined as a continuous loss in cord strength, was found not to exist in significant proportions.

The FRL researchers dissected and examined tires run on a New York City taxi fleet at rated pressures and loads up to 100,000 miles of use. All tires were tubeless, 7.50 x 14 and made by the same manufacturer. They were recapped every 20,000 miles. Three types of cord were tested including 1100/2 Tyrex viscose, 1650/2 Tyrex viscose and 840/2 nylon. Tires of varying mileage which exhibited no signs of failure were examined as were all tires which failed and exhibited the characteristics of what is called fatigue failure. Innermost ply cords were examined from the flex zone, from the tread center, and from the sidewall of the tires. The greatest loss in strength occurred in the flex zone.

Relative Cord Strength

In the tires which had not failed, cord strength as related to mileage exhibited a similar pattern in both the nylon and viscose tires. A fairly rapid drop in strength of flex zone cords occurred in the first 20,000 miles, a very gradual loss between 20,000 and 60,000 miles, and a slightly less gradual loss from 60,000 to 100,000 miles. Four tires, two nylon and two viscose, failed. These were dissected and the strength of the cords tested both near and away from the point of failure. With one exception, a nylon cord, the cords from the failed tires exhibited a strength comparable to what could be expected if the tire had not failed.

Individual viscose and nylon filaments were similarly examined and the conclusion drawn that weakening of filaments was so insignificant that it played no role in the fatigue of the cords. Only broken filaments were considered to be a factor and these occur suddenly, usually just before the time of failure. Although further research must be undertaken before final conclusions can be drawn, it was noted that localized bond failure frequently is present in fatigue failures. Once the adhesion gives way, the speaker said, cords are left to flex unrestrained and may very quickly fail.

Please Note

► According to an announcement published in the January, 1960 issue of RUBBER AGE, this issue should have been bound by a new adhesive method known as "slotted binding." Unfortunately, technical difficulties at our printing plant have delayed the adoption of the new binding method. Therefore, we will continue to bind each issue of RUBBER AGE in the conventional manner involving wire stitching until such time as the technical difficulties have been resolved.

Strauss Named Manager

► Richard Strauss has joined National Polychemicals, Inc., Wilmington, Mass., as development manager. He formerly was with American Cyanamid Co. as research engineer. Mr. Strauss is a graduate of Massachusetts Institute of Technology where he obtained his B.A. and M.S. degrees in chemical engineering. He also did graduate work at Ohio State University. Mr. Strauss also was associated with Arthur D. Little, Inc. and the Fuel and Oil Branch of Wright Air Development Center. He is a member of the American Chemical Society and the American Institute of Chemical Engineers.

Thirteen Papers on Elastomers On Gordon Conference Program

► Thirteen papers on the structure and properties of elastomers are scheduled to be presented on June 20 to 24 at Colby Junior College, New London, N. H., as part of the 1960 Gordon Research Conferences, which will be held from June 13 to September 2 concurrently at Colby Junior College; New Hampton School, New Hampton, N. H.; and Kimball Union Academy, Meriden, N. H. R. L. Zapp will serve as chairman of the Elastomers Conference and Gerard Kraus will be vice-chairman.

The five-day program for the Elastomer Conference is:

June 20, "The Chemistry of Halogenated Butyl—Preparation and Reactions," by F. P. Baldwin and I. Kuntz; "Chlorinated and Chlorosulfonated Polyolefins," by P. J. Canterino and G. R. Kahle; and "Present Status of the Chemistry of Vulcanization of Natural Rubber," by C. G. Moore.

June 21, "Behavior of Elastomers Under Rapid Deformation," by F. J. McGary; "Elastomer Dynamics," by M. Berger; and "Rolling Friction of Elastomers," by A. M. Beuche and D. G. Flom.

June 22, "The Butyl Lithium Initiated Polymerization of 1,3 Butadiene," by I. Kuntz and Arthur Gerber; "Influence of Organic Side Groups on the Rheological Properties of Polysiloxanes," by E. E. Polmanteer; and "The Rheology of Filler Load Rubber Vulcanizates," by A. R. Payne.

June 23, "Influence of Extension on the Electrical Anistropy of Elastomer—Carbon Black Compounds," by Rene Chasset; "Internal Rotations of Polymer Molecules in Response to Mechanical Stresses as Indicated by Birefringence Measurements," by R. W. Andrews; and "Mechanism of Ozone Cracking," by G. Salomon.

June 24, "The Vulcanization of Fluorocarbon Elastomers," by J. F. Smith and G. T. Perkins.

An index to Volume 86 of RUBBER AGE will be found on pages 173 to 176 of this issue.

Q and A on the

Food Additives Amendment

► *In an attempt to clarify the significance of the Food Additives Amendment to the rubber industry, the Rubber Manufacturers Association has issued a question and answer fact sheet for distribution to companies making rubber products used in the food and beverage industries. The questions posed by the industry with answers by officials of the Food and Drug Administration follow.*

Q. In general terms, how is the rubber industry affected by the Food Additives Amendment?

A. The amendment is designed to prohibit the use in food of additives which have not been adequately tested to establish their safety. As you know, the law applies to both "direct" and "incidental" use. You are apparently concerned with the possibility of an incidental additive. From a legal standpoint, you may not be affected by the law and, therefore, are exempt from its provisions if your product meets any of these three criteria.

(1) During the product's use it cannot reasonably be expected to become a component of the food or otherwise affect the characteristics of the food.

(2) During its use it does impart a component to the food and that component is generally recognized as safe.

(3) The use of the product was specifically sanctioned or approved by the FDA prior to September 6, 1958.

Q. Does the FDA determine what products are covered by law?

A. No. The amendment legally defines a "good additive" and establishes a procedure for regulating its use. It is the responsibility of each manufacturer to determine if his products are affected by this law. However, FDA will give its opinion as to the status of any substance if supplied with the necessary facts.

Q. Must a manufacturer apply to the FDA for an approval to continue making and selling his product?

A. No. Unless it is a food additive for which safe usage must be established by regulation. The amendment does not establish a licensing concept or procedure. A firm still has the right to decide for itself whether its product is subject to the Food Additives Amendment and if it thinks it is not, FDA has the obligation of proving in court that it is, before FDA can maintain actions against the product or the firm.

Q. Does it follow then that FDA expects each manufacturer to determine himself if his products are affected by the law?

A. Yes. As indicated by the answer to your first question, a product is not covered if it meets any of the three tests. If it does not meet any of these, then a manufacturer should proceed with caution and conduct his own investigation and tests to determine if his product imparts an unsafe component to food. FDA expects each manufacturer to draw upon the scientific and expert knowledge within or without his company and industry to determine if he is complying with the law.

Q. Since the law and regulations do not require FDA approval or license, how do you explain some advertising and publicity by certain companies claiming they have received FDA "approval" under this law?

A. There are two separate circumstances that might be involved here. First, the law provides and paragraph 121.3 (c) of the regulations explains that the amendment does not apply to food additives for which FDA granted a specific sanction or approval prior to the enactment of the amendment on September 6, 1958. In this case, therefore, manufacturers of food additives who have received such prior sanctions or approval may properly make this claim.

The second circumstance might relate to FDA action under paragraph 121.3 (d) of the regulations which provides, "The Commissioner, upon written request specifying the intended conditions of use and other pertinent information about a substance, will advise an interested person whether in his opinion the substance is a food additive." This provision was placed in the regulation to assist manufacturers who really did not know whether their product was a food additive as defined in the amendment, or whether any component that was imparted to food through the use of the product is recognized as safe.

Companies who have availed themselves of this regulatory provision have supplied information about the use of their product, what it is made of and the results of investigations indicating the product's performance in the presence of food. For example, they may have conducted extraction tests using simulated food solutions under exaggerated conditions to demonstrate that no component of the product migrated into the food solution. They may have supplied data showing some loss of material during the product's use, as in a rubber conveyor belt, but when the material loss is related to the quantity of food to which the product has been exposed, the potential material loss per unit of food is so minute it could not reasonably be expected to become a component of the food.

After review of such information, the Commissioner may be able to advise the company that in the opinion of the FDA the product is not a food additive. Under the amendment and the regulations this is an "advisory opinion" and not an "approval."

Q. What is the FDA's reaction to companies who have received such advisory opinion and then in publicity and advertising have used such terms as "received FDA approval for sale" or "FDA-approved" products?

A. The FDA has no control over a company's choice of words in publicity and advertising, but, insofar as the phrases you quote indicate that an approval or license is required of FDA, it is a corruption of the meaning and intention of the amendment. Administratively it would be impossible for FDA to review at this time, the many thousands of products and their uses that might fall under the scope of the amendment, and for this reason, encourages companies and industries to rely on their own chemists and scientists in determining compliance.

Q. Some of the companies within our industry making products such as rubber-coated aprons, protective footwear, refrigerator gaskets, etc., have been led to believe they might be involved because of their product's use in the food industry. How can we assure them they need have no concern?

A. In answer to your very first question, I stated that a product is exempt from the amendment if "during the product's use it cannot reasonably be expected to become a component of the food or otherwise affect the characteristics of the food." For the type of products you have just mentioned, they meet this rule and thus are exempt if as their identity indicates they are not used under conditions in which they can reasonably be expected to become components of food. I would not expect any part of a well formulated rub-

ber apron to become a component of food under the ordinary conditions of use.

Q. If we were to prepare a list of similar products, together with their use, that we believe are exempt under this rule, could FDA confirm our classification?

A. As I have already indicated, FDA would issue an advisory opinion under paragraph 121.3 (d) of the regulations as we have previously discussed.

Q. For the rubber products that come in direct contact with food, manufacturers have made tests to determine if there is any material migration into foods. Does the FDA specify any particular testing procedures or techniques that must be used to make this determination?

A. No. the manufacturer having knowledge of the materials going into his product and the conditions under which it is used should be better able to develop test procedures. You have referred earlier to extraction tests. These have been used by other industries to determine and measure material migration into typical simulated food solutions and might be adaptable in your case.

Q. In cases where FDA has already issued advisory opinions on rubber products, is it free to disclose the testing techniques used by the applicant to determine and measure the possible presence of a food additive?

A. Yes. Generally this information can be disclosed, but, of course, we could not disclose confidential compound and test data or reveal any trade secrets. We could disclose the test procedures but not the test data.

Q. We understand that industries such as can enamel who have worked with this problem for some years have standardized testing procedures. Would it be possible for a small technical committee from our industry to meet with the appropriate FDA staff officials to discuss testing procedures, with the objective of developing a recommended technique that could be used by the rubber companies to determine compliance with the amendment?

A. The FDA will be pleased to cooperate and will arrange for discussions with any such committee you may appoint.

Q. Extraction tests, using a minute sample of the vulcanized rubber compound, have been run in simulated food solutions under conditions considerably exaggerated from normal product use and have demonstrated a material loss from the sample. This material loss can be quantitatively measured and the migrant into the solution can be expressed in parts per million. With respect to this total material loss, can any tolerance be established as to safety?

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A. This question cannot be answered generally. For a cancer-forming substance the law provides for a zero tolerance within the limits of scientific measurement. For certain substances toxicologists might consider one part per million as pharmacologically insignificant, i.e., no migration; for others a higher level might be generally recognized as safe.

The law does not require a manufacturer to petition FDA to establish a safe level of usage except for the addition to food of any substance which within the definition of the law is a "food additive." Upon petition to FDA a regulation may be issued establishing safe usage in terms of limits of extractability for substances which enter food by extraction, i.e., incidental additives.

Q. Now that the Food Additives Amendment becomes fully effective on March 6, 1960, how can a manufacturer supplying rubber products to the food and beverage industry continue to operate?

A. On and after March 6, 1960, a manufacturer is required to comply with the amendment and the regulations. He is responsible for determining if he is in compliance and can be held accountable for violations. The manufacturer should first determine if he is exempt from the amendment by applying the three tests given in answer to your first question. With respect to prior sanctions or approvals granted before September 6, 1958, the manufacturer may inquire concerning a specific substance. A prior sanction granted to one is applicable to all.

With respect to the "reasonably expected" test, the manufacturer should have the needed information to apply this rule. He knows what his product is made of and how it is compounded and vulcanized. He knows the conditions of use and the types of food and beverage with which it comes in contact. He knows how long the product performs during its use and whether it deteriorates, abrades or otherwise loses material weight. He knows the quantities of food or beverage his product has been in contact with during its life. If it has undergone material loss he can reasonably compute quantities added per unit of food or beverage. From this knowledge he may be able to estimate whether his product could reasonably be expected to become a component of the food.

In addition to knowledge of his product's performance, a manufacturer could perform the relatively simple extraction tests that are used by other industries and to which you referred in your preceding question. In this situation the manufacturer knows the characteristics of the food or beverage with which his product is used and can select the appropriate simulated food solutions. He can exaggerate the test conditions as to temperature, volume of solution and immersion time to provide a safety factor compared with normal use. He can determine whether the rubber sample has lost material weight during the test and if so, can quantitatively compute the material loss per unit of solution. These results can be translated to normal use conditions. From these tests he should be able to make a decision as to whether his product could reasonably be expected to become a component of the food.

If the manufacturer knows through his knowledge of product performance or by results of tests, such as the extraction test, that a significant quantity of his product is added to food or beverage he must carry his investigations further to be certain of compliance. He can investigate the ingredients used in making his product and classify them as to safety. He may find it necessary to analyze the extract and classify such substance as to safety. He may find this necessary to test the applicability of the "generally recognized as safe" rule.

While the amendment is basically self-determining and self-policing, a manufacturer who is not equipped to make his decision can, by written request, seek an advisory opinion from FDA. To support such a request the company must supply all the information available to him on the product and its use.

Finally, you may find yourself obligated to satisfy your customers that you are complying with the amendment. You cannot ignore such requests and should be prepared to state unequivocally that your product is either exempt or complies. You should endeavor to keep up with regulations issued by FDA concerning food additives particularly those affecting the packaging industry and those related to incidental additives.

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G-E Sells Resin Plant

► The Chemical Materials Department of General Electric Co., Pittsfield, Mass., has sold its alkyd and polyester resin manufacturing plant in Anaheim, Calif., to Oronite Chemical Co., San Francisco, Calif. The purchase price was not disclosed. General Electric reports that as a result of the sale, the Chemical Materials Department will increase its concentration on the manufacture and sale of phenolics, polycarbonates, and fused magnesium oxide. A multimillion-pound-per-year plant for the production of polycarbonates is under construction at Mount Vernon, Ind., and is scheduled for completion about August 1960, the company states.

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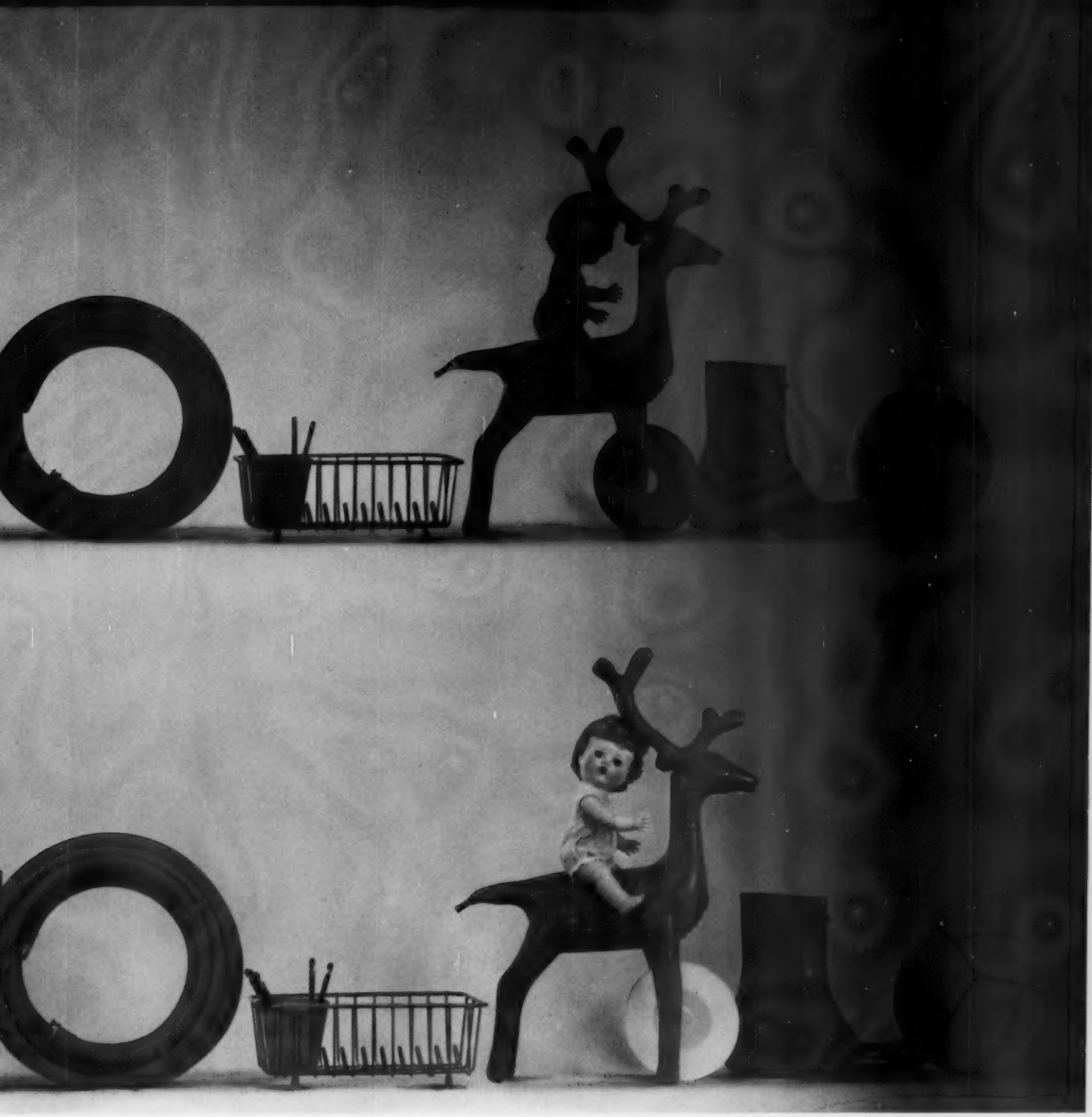

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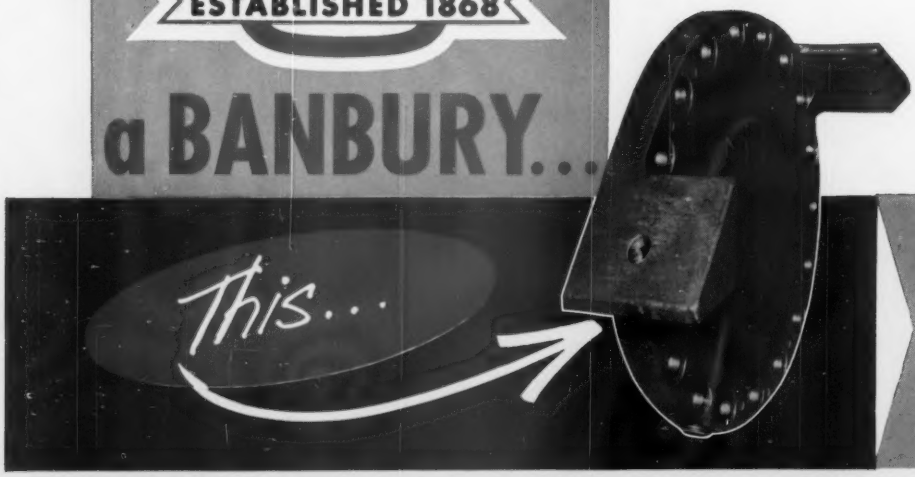

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Rubber Toys in Evidence At 57th American Toy Fair

► Thousands of new toys, not to be opened by the younger generation until Christmas, were displayed at the 57th Annual American Toy Fair sponsored by the Toy Manufacturers of the U.S.A., Inc., in New York City from March 7 to March 16. Over 13,000 toy buyers examined and ordered the products of the 1,408 exhibitors who displayed their products at the Hotel New Yorker, Sheraton-Atlantic Hotel, in showrooms at 200 Fifth Avenue and 1107 Broadway. An increasing number of toys made of or with vinyls, urethanes and latices were on display, as well as many molded rubber toys.

Ashland Rubber Products Corp., Ashland, Ohio, featured its new rocket balloon along with its regular line of Toytime balloons. Rubber and vinyl footballs, basketballs, and decorated playballs were displayed by Barr Rubber Products Co., Sandusky, Ohio. Do-it-yourself toy molding kits, which enable the user to fabricate his own rubber or plastic toys, were highlighted by Bersted's Hobby Craft, Inc., Monmouth, Ill. A variety of colored and illustrated rubber balls were featured by Cupples Co., Manufacturers, St. Louis, Mo., including the Kik-Nik, a ball with a looped rope attached which always returns to the child after he kicks it.

Eagle Rubber Co., Inc., Ashland, Ohio, introduced its new line of Fire-Glo chromatic colored sponge balls in addition to its regular line of sportsballs, decorated playballs and colored playballs. Faultless Rubber Co., Ashland, Ohio, featured its new Glo-Color ball and balloon line, as well as its regular line of rubber balls and balloons for all occasions. Rubber skin-diving equipment, such as goggles, masks and fins were displayed by Globe Rubber Products Co., Philadelphia, Penna. The Blue Bird line of balloons and Ray-Glo playballs, in assorted sizes and packages, were shown by National Latex Products Co., Ashland, Ohio. A full line of colored rubber toy animals ranging in size from small barnyard miniatures to bigger-than-life playpets, was displayed by Rempel Manufacturing, Inc., Akron, Ohio, along with its featured rubber hobby horses. Molded, soft rubber, full-face action masks were shown by Topstone Rubber Toys Co., Inc., Bethel, Conn. Van Dam Products, Inc., New York, N. Y., displayed balloons and its balloon butler that whistles while it blows up balloons. In addition to rubber toys, there were a great deal of wood, metal and fabric dolls, guns, hats, space ships, rockets, automobiles, boats and games to assure happy times ahead for children.

An index to Volume 86 of RUBBER AGE will be found on pages 173 to 176 of this issue.

Keener Addresses Security Analysts

► Capital expenditures of B. F. Goodrich Co. for new and improved facilities and equipment in 1960 will approximate $50 million, largest in the firm's history, remarked J. W. Keener, Goodrich president and chief executive officer, during a talk at a recent meeting of the New York Society of Security Analysts. Mr. Keener also reported that the company's present outlook on capital investment calls for an average of $50 million a year over the next five years, also a record. The rubber executive pointed out that while financing needs will depend to some extent on the timing of capital expenditures in relation to cash flow, Goodrich will not be reluctant, when and if it becomes timely and advisable, to go to the market for long-term funds. Mr. Keener explained to the New York group that after a new capital facility is completed, it takes six months to two years for the plant to reach a profitable level of operation. He said that 11 new plants or plant expansions that have not yet made their contributions to Goodrich net income or to unconsolidated company equity growth should start producing income at conservative levels this year. In addition, another six plants should become profitable in 1961 and four more of the company's plants should become profitable in 1962 to 1964.

Copolymer Expanding Butadiene Plant

► Copolymer Rubber & Chemical Corp., Baton Rouge, La., expects to start a $5 million expansion of its butadiene plant within the next four months, bringing its total current expansion to an excess of $8 million. Completion of the new expansion is scheduled for May 1961, and when it goes on stream will result in a 50 per cent increase in the firm's butadiene production. The building project also includes construction of a 95,000 square foot warehouse and further enlargement of pilot plant facilities employed by the Copolymer research staff. The company reports that the building program is aimed at meeting trade demands for its Carbomix synthetic rubber.

Hahn Named Vice-President

► Charles H. Hahn has been named vice-president and general manager of the Tire Division of Dayco Corp., formerly Dayton Rubber Co., Dayton, Ohio. In his new post, Mr. Hahn will have the responsibility for coordinating tire sales, merchandising and distribution programs on a national scale. He also will be in charge of tire manufacturing and development. Mr. Hahn attended the University of Akron and Kent State University. Prior to joining Dayco, he was associated with Firestone Tire & Rubber Co., Akron, Ohio.

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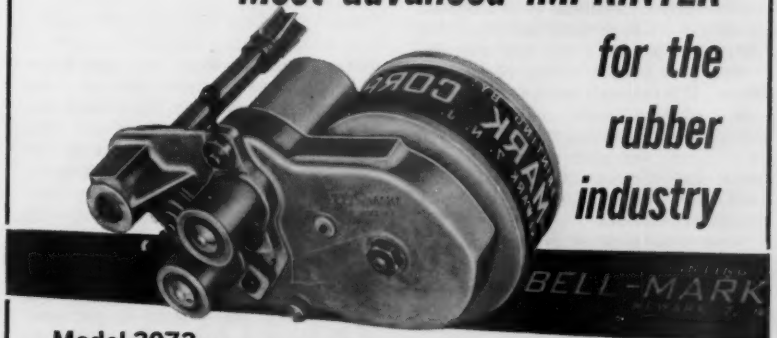

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Fort Wayne Group Hears Talk On Lexan Resins by Ackerman

► The third meeting of the 1959-1960 season of the Fort Wayne Rubber and Plastics Group was held on February 11 at the Van Orman Hotel in Fort Wayne, Ind. One hundred and sixty-eight members attended the dinner meeting and heard Harry F. Ackerman (General Electric) speak on "Lexan Resins." Following the program a movie on the manufacture of butadiene-styrene rubber was shown.

In his talk, Mr. Ackerman stated that for years designers and engineers have been looking for a material that would either replace metals or be combined with them in certain applications. In the field of plastics they found a partial solution. However, a void area remained which was dominated by the need for materials with such important qualities as unusual strength, heat resistance, dimensional stability and resistance to creep and cold flow under load. According to the speaker, the void has been partially filled with the introduction of a new plastic material, polycarbonate resin, typical of which is General Electric's Lexan resin.

Resin Characteristics

Mr. Ackerman explained to the group that Lexan resin is characterized by such outstanding properties as high impact strength, high heat resistance, excellent dimensional stability, and in combination with these desirable physical properties, Lexan has good electrical properties. The speaker explained that the properties make this new material suitable for a wide variety of applications. It is presently being used in business machine parts, military components, electrical and electronic parts, instrument, automotive, pump, appliance and communication equipment, and many other industrial and consumer applications.

One of the most important considerations for Lexan resins and other newly developed materials, he said, is the steady upgrading of material specifications by engineers and designers. The present trend is toward automation, miniaturization, higher operating temperatures, improved performance, cost reduction, elimination of flammable materials, and weight reduction. Mr. Ackerman felt that these requirements have not been met by previously available plastics, and it is in this general area that this new engineering material, polycarbonate resin, is finding many of its most important applications in industry.

The Fort Wayne Rubber and Plastics group reports that it is considering the setting up of a rubber and plastics technology lecture course. The purpose of this course is to provide an improved understanding of the rubber and plastics art for those who are incidentally concerned with its technology, and for those who may have recently come into the industry. In order to fully evaluate the general interest in this proposed activity, the group has sent a questionnaire to its members for their opinions on the proposal.

G. D. Godfrey

Named President of Voit Rubber

► George D. Godfrey has been elected president of W. J. Voit Rubber Corp., Los Angeles, Calif., succeeding Willard D. Voit, who has been named chairman of the board of directors. Mr. Godfrey graduated from Colby College with a degree in business administration. He joined Voit in 1950 as a laborer, but was soon moved to the Industrial Engineering Department and eventually was placed in charge of the department. He later became assistant production manager and assistant to the president. In 1957, he became vice-president in charge of marketing, a position he held until his election as president.

McNeil Machine Buying Firm

► McNeil Machine & Engineering Co., Akron, Ohio, has offered to purchase F. E. Myers & Brothers Co., Ashland, Ohio, for a reported $12 million or $60 a common share of stock. According to McNeil, a contract for the sale is being prepared and will be submitted to Myers stockholders for approval. The Myers firm manufactures water pumps for farm and home use and power spraying and water conditioning equipment. It has two manufacturing plants and a Product Development Division in Ashland, and a Canadian sales subsidiary.

An index to Volume 86 of RUBBER AGE will be found on pages 173 to 176 of this issue.

Chicago Group Hears Perlberg On Mill Room Facilities

► "A Review of Modern Mill Room and Calender Facilities" was the subject of a talk given by S. Everett Perlberg (Adamson United) before the Chicago Rubber Group on January 29. Mr. Perlberg discussed new designs and applications of mills, new mixing techniques, calender design and application, and a comparison of the Intermix and Banbury. Basing his remarks around the gain in efficiency which can be accomplished by proper utilization of new and existing equipment, the speaker developed several thoughts which showed that improved efficiency also tended to improve quality standards of finished products. Automation of mill room equipment, including intensive mixers, was indicated as one possibility for large rubber manufacturers but problems of small rubber manufacturers with frequent batch changes mitigated against too much automation.

Discusses Intensive Mixers

Suggesting the use of modern type intensive mixers, the speaker indicated that better dispersion and reduced maintenance could be obtained as a result of fixed center distances on rotors. He pointed out that rotors would be mounted on roller bearings outboard of the main body, and the use of separate gear cases, instead of connecting gears, for driving the rotors would result in reduced maintenance. By proper design of the ram and throat, greater variations in batch sizes would be possible with no reduction in quality of mix. According to the speaker, the mill, which is the most basic form of breakdown in mixing equipment, lacks uniformity of dispersion because of the fact that it is manually controlled.

Mr. Perlberg's remarks about friction ratios showed that little was to be gained by working for infinitely variable friction ratios on mills. His discussion of temperature showed that even in mill equipment, the use of drilled rolls with circulating closed-circuit water systems would go a long way towards providing constant stock temperature and, therefore, improving dispersion. This contrasts with the present system where the operator controls the water valves by a sixth sense and opens and closes valves at will, he exclaimed. The speaker also covered uneven setting of the rolls, which tends to force the stock to the loose or open side of the mill. Also requiring consideration, is the abrasion of rolls in the mill and the desirability of rehoning these rolls periodically for more uniform contour and gap control. Mr. Perlberg concluded his talk with a brief review of different types of calenders and discussed some of the varied problems inherent in providing multiple roll drives.

Quality Control Program Planned

► A conference to aid quality and technical heads of rubber companies to keep abreast of new developments and ideas for economical quality control will be held at the White Sulphur Springs Hotel, Bedford County, Penna., on April 24 to 29. Arranged by Edward A. Reynolds (Consultant) with the assistance of Simon Collier (Johns-Manville, Ret.) and Thomas Shahnazarian (IBM Consultant), the Quality Control Conference for Rubber Companies will feature talks by 12 guest speakers and discussion leaders, each recognized as an expert in his particular area of quality control work.

Engineering, statistical and administrative aspects of the rubber industry will be covered as well as data on other types of manufacture having useful applications in rubber control. A brief introductory meeting on Sunday evening will begin the program. Lectures, discussions and demonstrations have been scheduled to take place from 8:30 a.m. to 4:30 p.m., Monday through Friday, and informal evening sessions will take place each day. Speakers will be available for individual discussions on particular problems, and luncheons and other informal meetings have been arranged to encourage informal interchange of ideas among those attending. For information or reservations, write to E. A. Reynolds, R. D. No. 1, Ligionier, Penna. Attendance will be limited to a maximum of 25.

3M Improves Fluorel Elastomer

► Minnesota Mining & Manufacturing Co., St. Paul, Minn., reports that it has made significant improvements in the workability of its highly-fluorinated elastomer, Fluorel KF-2141 Brand Elastomer. The elastomer is rated for service above +400°F. and is said to resist corrosive chemicals. The new version of the product, introduced a year ago, has a Mooney scorch rating almost three times that of the original product, the company states. In addition, it provides a fast cure with good heat aging qualities and retains all other characteristics including low compression set after cure.

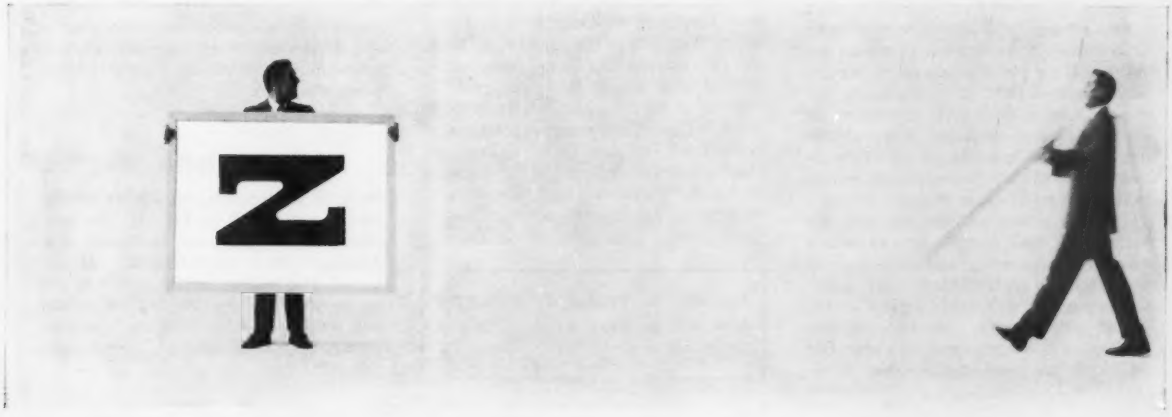
Top row—left to right: Alan W. Bryant, Donn A. Snyder, John J. Peters. Bottom row—left to right: John A. Stipak, Roger J. Daly.

Columbian Carbon Reorganizes Staff

► Five changes have been made in the sales organization of the Carbon Black and Pigment Division of Columbian Carbon Co., New York, N. Y. Alan W. Bryant has been appointed sales manager for industrial products; Donn A. Snyder becomes product manager for Mapico iron oxides; John J. Peters has been named product manager for specialty blacks and base dispersions; John A. Stipak has been assigned to perform market studies for the division; and Roger J. Daly will handle advertising and sales promotion in addition to coordinating the firm's packaging program. The company reports that Mr. Bryant will be responsible for sales of all Carbon Black and Pigment Division products to customers other than those in the rubber industry. He will be in charge of sales of Mapico iron oxides, specialty blacks, lamp blacks, bone blacks and all dispersion products. Mr. Snyder and Mr. Peters will assist Mr. Bryant. Mr. Stipak will handle all sales forecasts, market studies, sales analyses and general statistics, and Mr. Daly will be responsible for all advertising, films, exhibits, and sales promotion programs.

National-Standard in Partnership

► National-Standard Co., Niles, Mich., has entered into a partnership with the Arbed and Felten & Guilleaume organizations of West Germany to manufacture tire bead wire and tire carcass wire. The new company is located in Cologne, West Germany, and is called F&G—Arbed-National Standard GmbH.



New York Rubber Group Holds Symposium on Polyethylene

► Over 300 persons attended a symposium on cross-linked polyethylene held by the New York Rubber Group on March 25 at the Henry Hudson Hotel in New York City. E. S. Kern (R. T. Vanderbilt) served as chairman of the technical session at which three papers were presented. The topics and their speakers were: "Polyolefins—Beginning and Future" by Ray Urban (Union Carbide Plastics); "Compounding Cross-Linked Polyethylene" by B. C. Carlson (R. T. Vanderbilt); and "Cross-Linked Polyethylene in the Wire Industry" by G. W. Kuckro (General Electric).

Mr. Urban, the first speaker, reviewed the early history of polyethylene, and told about the events that led to its discovery in England in the 1930's. He remarked that polyethylene was first used commercially as a submarine cable insulation. World War II resulted in its use in radar cable insulation, where it played a key part in the successful use of radar during this period. In his discussion of the market growth of polyethylene, Mr. Urban stated that in 1959 over one billion pounds were produced compared with six million pounds in 1945. Its wide use in the wire and cable industry was followed by film and molding industries as major markets.

The speaker briefly outlined high and low pressure processing of polyethylene, and illustrated its basic properties and their relationship to average molecular weight and crystallinity. He also covered several general types of polyethylene used by specific end use markets with melt index and density as parameters. Mr. Urban concluded his talk with a brief discussion about polypropylene and copolymers and their possible place in the future growth of the market.

Discusses Compounding

The next speaker, Mr. Carlson, reviewed some of the advantages which may be realized by the proper compounding of polyethylene. According to the speaker, the advantages are: improved tensile strength; improved heat stability; improved heat resistance; wide ranges of hardness values; wide ranges of stiffness values; improved impact resistance for a given hardness; improved flex resistance for a given hardness; improved solvent resistance; improved resistance to environmental stress cracking; improved low temperature properties of filled compounds and reduction in material costs through loading.

Mr. Carlson pointed out that the melt index and specific gravity which affect the processing and properties of thermoplastic polyethylene also affect the processing and properties of cross-linked polyethylene. In addition, the state of cure as measured by a modified Williams per cent compression is related to tensile properties, abrasion and brittle point. He also discussed other processing procedures, and suggested several applications of typical compounds for use in pipe, conduits and sponge.

Mr. Kuckro, the final speaker, stated that, initially, polyethylene was used in the wire and cable indstry as an insulation for low loss, high frequency coaxial cable and later for communication, control, signal, lighting and power cables. In fact, he pointed out, it comes closer to being the ideal dielectric than any other polyolefin which has been investigated.

Mr. Kuckro told the group about the development of a vulcanized polyethylene, Vulkene, and discussed its processing and properties. The properties discussed included electrical stability, abrasion resistance, physical properties after aging, low temperature tests, effect of overheating, chemical resistance, and tensile and elongation. He concluded his remarks with a brief comment on the patent situation in regards to vulcanized polyethylene.

Following the technical meeting, the group held a dinner which was attended by 192 persons. Ten door prizes were presented to lucky ticket holders. E. S. Kern (R. T. Vanderbilt), chairman of the New York Rubber Group, reported to the group members that the Executive Committee had approved a dinner-dance, which will be held on May 20 at the Roosevelt Hotel in New York City. He also announced that the group's summer outing will be held on June 9 at Doerr's Grove in Millburn, N. J., and the golf outing will be held on August 2 at the Forsgate Country Club in Jamesburg, N. Y.

Charter Flights

M. E. Lerner (RUBBER AGE), secretary-treasurer of the New York Rubber Group, informed the members about three charter flights to Europe that are being arranged through the auspices of the Society of Plastics Engineers so that interested persons can attend various technical meetings on the continent. Of the three flights, which are reported elsewhere in this issue, the Rubber Division, ACS, is considering sponsoring the third flight which leaves for London, England, on October 6 and will return from either Amsterdam or Brussels on October 23. Mr. Lerner stated that persons taking this flight will be able to attend the International Synthetic Rubber Conference in London, to be held on October 11 to 13, and the International Congress on Technology of Plastics Processing in Amsterdam, to be held on October 10 to 19.

An index to Volume 86 of RUBBER AGE will be found on pages 173 to 176 of this issue.

Theodore S. Hodgins

Century Plans Expansion

► Century Chemical Corp., New York, N. Y., has announced that it will up its expansion program in 1960 and double gross sales to $20 million by the end of the year. According to Theodore S. Hodgins, president of Century Chemical, the company is building from a fiexible organizational base, and is actively and aggressively exploring all fields of chemical manufacture for both the United States and foreign markets. The organization already covers many and diverse fields of chemical production ranging from fine chemicals for drugs and cosmetics to road paving materials, Mr. Hodgins states.

Formed in September 1958, Century acquired Wilson Organic Chemicals, Inc. Sayreville, N. J., a producer of organic dyestuffs, pigments and aromatic fine chemicals. A short time later, Century went on to acquire Chemo Puro Mfg. Corp.; Oil & Chemicals Terminals, Inc.; and the Asphalt Division of Oil & Chemical Products, Inc., all of Newark, N. J., plus Chemo Puro AG, a European sales organization in Zurich, Switzerland. Outlining plans for the future, Mr. Hodgins states that Century's broad expansion goals are in the fields of nitration, chlorination and oxidation, which means all fields of the chemical industry. Eventually, Century hopes to have a broad line of intermediate chemicals, some of them captive, and others to be put on the market, Mr. Hodgins states.

U.S. Rubber Selling Plant

► U. S. Rubber Co., New York, N. Y., has agreed to sell its Fort Wayne, Ind., plant to International Harvester Co., Chicago, Ill. According to International Harvester, the 60-acre site and its factory of more than 500,000 square feet of floor space is located adjacent to its Fort Wayne works. Terms of the purchase were not revealed.

Wright

Worrall

Bragg

Ford

Frampton

Hague

Hilbish

Falls Engineering Appoints Seven

► Seven appointments have been made in sales, engineering and production capacities by Falls Engineering and Machine Co., Cuyahoga Falls, Ohio. David Wright has been appointed vice-president and sales manager; Ashton L. Worrall, Jr., becomes chief engineer; Archie E. Bragg has been named production manager; Carl L. Ford becomes development engineer; Paul A. Frampton is now a sales and service engineer; Robert Hague has been appointed manager of service operations; and Harold L. Hilbish becomes purchasing agent and chief estimator. Mr. Wright, in his new post, will head up sales of the firm's special machinery and equipment. He attended Kent State University and for the past eight years has handled various sales and service assignments for the firm. Mr. Worrall joined Falls Engineering in 1959, and previously had been with U. S. Rubber Co. He is a graduate of Drexel Institute of Technology.

Mr. Bragg has been with Falls Engineering for 20 years, and formerly was with Babcock and Wilcox. Mr. Ford attended Akron University. Prior to joining Falls Engineering in 1946, he was associated with Firestone Tire & Rubber Co. Mr. Frampton attended Akron University and joined Falls Engineering in 1958 after serving 10 years with Luxaire Cushion Co. Mr. Hague attended Kent State University and prior to joining the company in 1950, had been with Fageol Products Co. Mr. Hilbish holds a degree in mechanical engineering from Akron University. He joined the firm in 1955, from the Herman Machine Co.

Southern Group Meetings

► The Southern Rubber Group reports that its next meeting will be held on June 10 and 11 at the Dinkler-Tutwiler Hotel in Birmingham, Ala. The meeting will consist of panel discussions on "Market Trends for the Rubber Industry and Expected Future Basic Compounds" and "The Mechanization of the Rubber Industry." In an effort to aid its members in making plans to attend future meetings, the Southern Rubber Group has announced the following dates and places of its future meetings:

October 7 and 8, 1960, Roosevelt Hotel, New Orleans, La.;

January 20 and 21, 1961, Statler Hilton Hotel, Dallas, Texas;

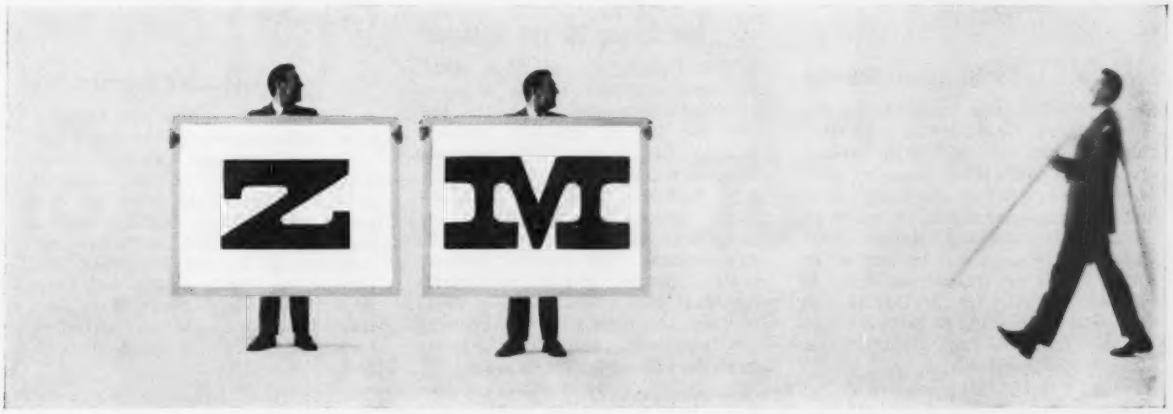
June 23 and 25, 1961, Buena Vista Hotel, Biloxi, Miss.

Sun Rubber Files with SEC

► Sun Rubber Co., Barberton, Ohio, has filed a registration statement with the Securities and Exchange Commission which proposes a public offering of $1 million of 6 per cent subordinated debentures due April 1, 1975. This is part of a $2,750,000 financing program which includes a $750,000 mortgage loan from a bank and $1 million loan from McNeil Machine & Engineering Co. McNeil received 6 per cent promissory notes due serially to 1976 and 100,000 shares of common stock. In the public offering, Sun plans to sell the debentures in units consisting of $100 and 10 shares of common stock. A total of 100,000 shares of common will be sold with the debentures. McDonald & Co. of Cleveland is the principal underwriter.

Wire and Cable Symposium Planned

► The 9th Annual Symposium on "Technical Progress in Communication Wires and Cables" will be held on November 30, December 1 and 2 at the Berkeley-Carteret Hotel, Asbury Park, N. J., under the sponsorship of the U. S. Army Signal Research and development Laboratory. Howard F. X. Kingsley (Fort Monmouth Laboratory) will serve as general chairman. He will be assisted by C. T. Wyman (Bell Telephone Laboratories); Ray Blain (U. S. Army Signal Engineering Agency); Richard P. Houlihan (Gavitt Wire); Spencer Montgomery, Jr. (Montgomery); Ira T. Stoneback (I. T. & T. Laboratories); H. L. Wuerth (Goodrich Chemical); and Fred W. Wills (Signal Research and Development Laboratory).



Boston Holds Spring Meeting

► The Spring Meeting of the Boston Rubber Group held on March 18 at the Somerset Hotel in Boston, Mass., attracted over 250 members and guests. Principal speakers at the meeting were H. E. Railsback (Phillips Chemical) and H. R. Nebeker (Shell Chemical). Mr. Railsback discussed "*Cis*-4 Polybutadiene," while Mr. Nebeker spoke on "Polyisoprene and Its Vulcanizates." Both papers were previously presented at the January 22 meeting of the Philadelphia Rubber Group, a report on which appeared in the February, 1960, issue of RUBBER AGE. The technical portion of the meeting was followed by a dinner at which Tom Fitzgerald, golf and hockey editor of the *Boston Globe*, spoke. The Spring Meeting represented the first meeting of the 32nd year in the group's history.

It was reported that group membership now totals approximately 1,000 and that the group treasury has over $4,300. In recognition of his services to the group, Past-Chairman William H. King (Acushnet Process) was presented with a tie clasp. A plea for members to join the ACS Division of Rubber Chemistry was made during the meeting. Also announced was the fact that the recent ski outing had attracted 97 members and guests. The Boston Rubber Group is sponsoring courses in rubber technology at Northeastern University and it was announced that 41 are enrolled for "Rubber Technology II," an advanced course. The next meeting of the group will be the annual summer outing which will be held on June 17 at the Andover Country Club, Andover, Mass. The group will serve as host to the Rubber Division at the 1962 meeting.

James Breen (Barrett & Breen), group chairman, reported that a mail survey had been conducted to determine whether a dinner-dance should be held by the group. Although the returns were evenly divided, the Executive Committee decided that the group, as such, would not hold such a function, but Mr. Breen indicated that if any member or group of members wanted to handle the details involved in a dinner-dance, such an enterprise would have the blessings of the group.

Tamms Names McDonald

► Tamms Industries Co., Chicago, Ill., has named E. C. McDonald as its technical director. Mr. McDonald has had broad experience in all phases of paint formulation, product and quality control, the company states. A native of Kansas, he attended Kansas State Teachers College where he received an A.B. degree in chemistry. Prior to joining Tamms, Mr. McDonald was technical director and production supervisor of Industrial Paint Manufacturing Co., Birmingham, Ala.

European Charter Flights

► Through the auspices of the Society of Plastics Engineers, three charter flights to Europe are being arranged so that interested persons can attend various technical meetings scheduled to be held on the continent during the year. One flight will leave on June 17 for Brussels, returning on July 4. A second flight will leave on July 29 for Paris and Vienna, returning August 12. The third flight will leave on October 6 for London and will return from Amsterdam or Brussels on October 23. It will be remembered that the International Synthetic Rubber Symposium will be held in London on October 11-13. The round-trip fare will amount to $270 to $300 per person and the deadline for application for the first flight is May 10. Those interested in the flights should contact Dr. Heinz Neunteufel, 116-16 Audley St., Kew Gardens 18, N. Y.

American Enka Combines Two Units

► American Enka Corp., New York, N. Y., recently formed the William Brand-Rex Division, by consolidating two of its subsidiaries, Rex Corp. and William Brand & Co. The purpose of the move was to combine and integrate its activities in the plastic-covered wire and cable field. The combination creates a new operating unit with sales of $15,000,000 to $20,000,000 a year. New executive offices are being opened in Concord, Mass., with expanded sales engineering and technical service facilities. Gilbert E. Bell, formerly president of Rex, becomes director of marketing; Alfred E. Brand, formerly president of William Brand, becomes director of manufacturing; and Robert J. Rodday, formerly executive vice-president of Rex, becomes director of administration and development.

Dow Corning DC 199 Surfactant

► Dow Corning Co., Midland, Mich., has introduced what is said to be an improved silicone-glycol surfactant, DC 199, for use in one-shot urethane foams. The syrupy (5500 centipoise) liquid is a copolymer of dimethyl silicone fluid and an unspecified polyglycol. Instead of mixing two or more components, in place, to make a foamed polyisocyanate, the one-shot foaming process pumps several components separately into a special nozzle where they mix and begin to react. Foaming is well under way as the material moves from the wide orifice into a mold.

Polyethylene Film Discussed

► Polyethylene film production capacity is now 450 million pounds annually or double the capacity of only two years ago, according to J. L. Rodgers, director of sales for the Union Carbide Plastics Co., New York, N. Y., who spoke recently at the National Flexible Packaging Association. Mr. Rodgers warned that aggressive market development is necessary to overcome a serious overproduction problem and an accompanying poor profit picture, particularly in the flexible packaging field, which accounts for 75 per cent of all polyethylene film. While the use of polyethylene film, up 500 per cent in the last five years, continues to be the fastest growing segment of the plastics industry, the industry's annual production capacity is more than 25 per cent higher than total film use in 1959.

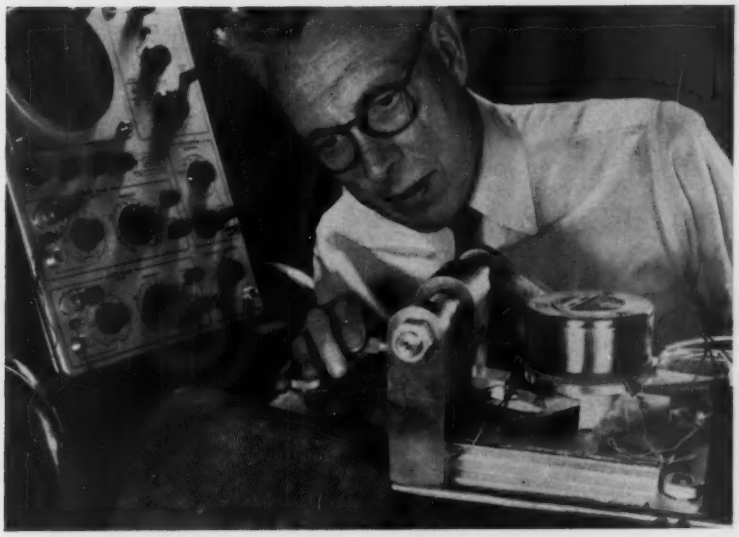
Mr. Rodgers pointed out that this capacity will continue to increase during the coming year. The enormous rise in production capacity, he said, resulted in part from a three-fold increase in the number of film extruders since 1953 together with addition of new capacity by existing companies. Another important factor is the greatly increased productivity of modern extrusion machinery. Three specific areas that could add more than 100 million pounds to annual film consumption in 1963 were cited including the bakery field, the produce packaging field and the packaging of paper products.

Appointed Vice-President

► Midland-Ross Corp., New York, N. Y., has named C. J. Schmidt, executive vice-president of the J. O. Ross Engineering Division, a vice-president of the corporation. A 1923 mechanical engineering graduate of the University of Wisconsin, Mr. Schmidt joined the Ross organization in 1930, working in the Chicago office of the company. He became manager of the Detroit offices of J. O. Ross Engineering in 1933, and was elected vice-president of the company in 1947. In 1954, he was made vice-president and sales manager and was transferred to the New York office. Mr. Schmidt became executive vice-president in 1956.

Named Sales Representative

► John N. Guidice has been named a sales representative for the Resin and Chemical Division of Catalin Corp. of America. Mr. Guidice will be located in the firm's Chicago office and will cover resin accounts, including acrylics and other liquid resins, in the Midwest. Educated at Rutgers University, Mr. Guidice has been associated with Catalin at the company's Fords, N. J., plant since 1955, where he has served in Catalin's Central Research Laboratories.



Dr. Fitzhugh W. Boggs conducts tests of the stippled rubber coating material which promises to eliminate turbulence of vessels moving through water.

Rubber Coating to Speed Water Transport

► United States Rubber Co. has announced initial success in its joint research effort with Coleman-Kramer, a Los Angeles, Calif., engineering firm, to develop a specially designed rubber coating which would overcome the turbulence normally created by objects moving through water. Submarines and pleasure craft should be able to double their speeds without any increase in power, according to Dr. Max O. Kramer, the former German missile scientist who invented the coating.

Dr. Fitzhugh W. Boggs, U.S. Rubber research associate, heads a team of scientists studying drag reduction in water transport at the company's Wayne, N.J., research center. Wide use of the coating is foreseen for motor boats that plane on the water. However, the principle known as "boundary layer stabilization" is theoretically applicable to anything that moves through liquids or gases. Current studies envision its extension to missiles, rockets and planes in flight.

Experimental models have been constructed of a 1/16-inch thick, natural rubber sheet from which a mass of tiny rubber pillars protrude. An aqueous solution of silicone or high polymer constituted the viscous fluid flowing around the pillars to absorb waves of turbulence created by a vessel's motion. The damping effect could also be produced by synthetic coatings with air substituted for the fluid.

Although U.S. Rubber already has plans to market the coating under the name of "Lamiflo," working models are not expected before the end of this year. Several major hurdles remain to be cleared by researchers. One problem is the prevention of leaks in the material through which the damping fluid could escape. Another potential obstacle is presented by the need to maintain the surface free of foreign matter when in use. The device has also not yet been able to overcome drag from bow waves that are about ten times as strong as the surface drag it is designed to absorb.

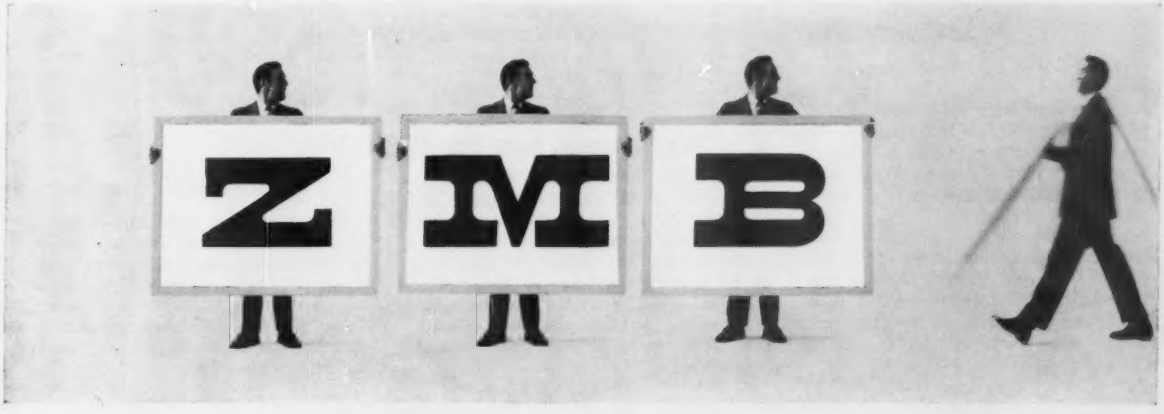
Dr. Kramer developed his laminar flow theory after wondering why a porpoise could swim so swiftly with so little apparent effort. His calculations showed that turbulence did not form along the animal's body. A microscopic study of porpoise skin revealed it to be elastic and ducted. Dr. Kramer adapted this principle to the construction of test bodies he towed in a motor boat along the California coast. Telemetering instruments, derived from guided missile research techniques, collected frequency shifts signals registering a 50 per cent reduction in surface drag. A 90 per cent elimination of drag is theoretically possible.

Goodyear Expanding Fabric Plant

► A $2.5 million facility for the expansion of its 3-T tire fabric production is being built at the Cartersville, Ga., plant of Goodyear Tire & Rubber Co. The new unit, second at the Georgia location, will require an approximate 60 per cent increase in the size of existing building facilities. According to Sam DuPree, Goodyear vice-president of production, the new facility will be devoted to the production of fabric which is "set" at the point of its maximum strength and resiliency through precise control of tension, temperature and time. Engineering work on the building addition is nearing completion, and the facility is expected to be in operation early in 1961.

Martin Enters Toy Tire Field

► Martin Rubber Co., Long Branch, N. J., has purchased the Toy Tire Department of the Auburn Rubber Co., Auburn, Ind. Martin Rubber plans to start off in this field with 64 different sizes of stock molds and will also handle requirements on toy tires from the smallest to the largest sizes. Some of the tires are smooth while many of them have treads and lugs.



C. P. Albus

Appointed by Colton Chemical

► Charles P. Albus has joined the polymer research group of the Colton Chemical Co., a division of Air Reduction Co., Inc., Cleveland, Ohio. Mr. Albus has had extensive experience in polymer chemistry since receiving his B.S. degree in chemistry, metallurgy and ceramics from the University of Alabama in 1940. He has been a member of the research departments of Hercules Powder Co. and General Aniline and Film Corp. Mr. Albus has done graduate work at the University of Delaware and has obtained a number of patents in the application of homopolymers and copolymers.

Hewitt-Robins Names Harris

► Pitt B. Harris, previously acting general manager, has been appointed general manager of the Foam Products Division of Hewitt-Robins, Inc., Stamford, Conn. Mr. Harris will be headquartered at the firm's urethane foam plant in Franklin, N. J., and will be responsible for the production, sales, product development and all other phases of the company's synthetic foam products operation. Mr. Harris joined Hewitt-Robins in 1947 as a field sales representative and later became manager of the Chicago office of the Foam Products Division. He was appointed sales manager of the division in 1958 and acting general manager in December 1959.

Promoted by Petro-Tex

► Dr. L. Marshall Welch, director of research for the Petro-Tex Chemical Co., Houston, Texas, has been appointed a vice-president of the company. Dr. Welch joined Petro-Tex as director of research in 1956 after long service with Standard Oil Development Co.; E. I. du Pont de Nemours & Co., Inc.; Carter-Bell Chemical Co.; and the Central Research Laboratories of Food Machinery & Chemical Corp. He will continue to direct Petro-Tex research planning and activities at the Houston, Texas, and Princeton, N. J., laboratories.

Firestone Splits Stock

► Firestone Tire & Rubber Co., Akron, Ohio, has announced that its stockholders, at the annual stockholders meeting on January 16, have approved a three-for-one split of its common stock, effective on or about January 25, 1960. The stockholders also authorized the enlargement of the board of directors from nine to eleven members and approved a new stock option plan for employees. Newly-elected to the board of directors were E. H. Schulenberg and E. B. Hathaway, and the following nine directors were re-elected to the board: Harvey S. Firestone, Jr., Lee R. Jackson, Raymond C. Firestone, James E. Trainer, Leonard K. Firestone, Roger S. Firestone, John J. Shea, H. H. Hollinger, and Joseph Thomas.

The board of directors re-elected the following officers: *Chairman,* Harvey S. Firestone, Jr.; *Vice-Chairman,* Lee R. Jackson; *President,* Raymond C. Firestone; *Executive Vice-President,* James E. Trainer; *Vice-President, Secretary* and *General Counsel,* Joseph Thomas; *Vice-Presidents,* E. B. Hathaway, Harold D. Tompkins, Joseph A. Meek, Louis J. Campbell, Harold M. Taylor, and John L. Cohill; *Comptroller,* Claude A. Pauley; *Assistant Treasurer,* Elden H. Eaton; *Assistant Secretary,* Henry S. Brainard; and *Assistant Comptrollers,* Laurence Frese and Lee R. Shannon. The company also announced the retirement of H. H. Hollinger as vice-president in charge of finance. Mr. Hollinger will continue as a member of the board of directors.

Develops New Masterbatch

► Goodrich-Gulf Chemicals, Inc., Cleveland, Ohio, has announced the development of high dispersion, Micro-Black masterbatch called Ameripol 4761. According to the company, Ameripol 4761 is a carbon black masterbatch of SAF black in an aromatic oil-extended, cold SBR. As in the other Ameripol Micro-Black polymers, high dispersion is obtained by high shear agitation, bringing latex, extending oil and carbon black into intimate contact immediately before coagulation, the company states. The company suggests the use of the new masterbatch where superior quality and abrasion resistance are required, such as in premium tires, camelback and belting.

Metasap Becomes Nopco Division

► Metasap Chemical Co., formerly a subsidiary of the Nopco Chemical Co., Newark, N. J., has become a division of that firm. In this change, Tom Campbell, manager of Metasap Chemical, has been named manager of the newly formed Metasap Division. The sales production and laboratory personnel will continue to serve in their present capacities.

L. J. Keyes

Named Vice-President by Dayco

► L. J. Keyes has been named vice-president and director of purchases for Dayco Corp., formerly Dayton Rubber Co., Dayton, Ohio. In this newly-created post on the corporate staff level, Mr. Keyes will have the responsibility of coordinating the purchasing functions of all of the firm's divisions. Mr. Keyes joined the company in 1945 as assistant director of purchases. He previously worked with the Purchasing Department of Inland Manufacturing Co., Dayton, Ohio.

Koppers Develops New Latex

► A new butadiene-styrene latex said to be designed to meet the requirements of the textile industry for a latex which will produce a soft "hand" and yet not require vulcanization, has been developed by the Plastics Division of Koppers Co., Inc., Pittsburgh, Penna. Known as Dylex K-40, the product primarily fills the need for a latex which will produce a more pliable carpet backing, especially where scrim is applied, the company states. In addition, Dylex K-40 is said to be applicable in the upholstery field because of its flexibility. Koppers claims that this product is the "softest" butadiene-styrene latex obtainable among the various types which do not require vulcanization. Available only with an antioxidant already incorporated into it, Dylex K-40 is reported to have successfully passed rigid aging tests and to retain its flexibility under extreme aging conditions in laboratory tests and field trials.

Goodrich Names Trevor Boyce

► B. F. Goodrich Industrial Products Co., Cleveland, Ohio, has announced the appointment of Trevor Boyce Associates, Inc., as applicator of its rubber linings for tanks, pipe and fitting. Trevor Boyce Associates operates a plant in Dayton, Texas, and has its offices in Houston, Texas.

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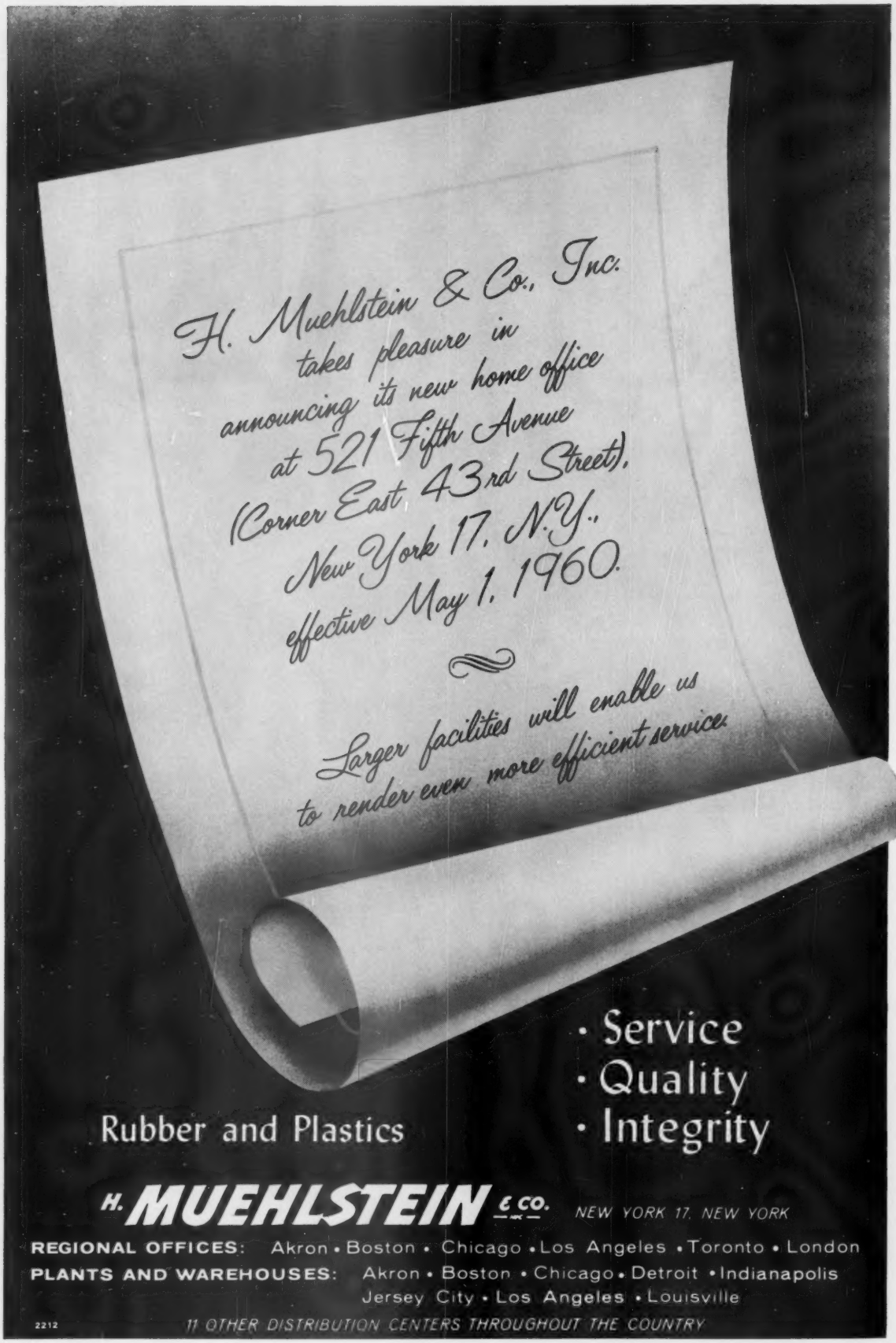
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Cabot Names Six

► Godfrey L. Cabot, Inc., Boston, Mass., reports six recent personnel changes and additions within its organization. Werner A. Bacher, previously with Tracerlab, Inc., has joined the company as a staff assistant in the Foreign Operations Department. Warren C. Yee, a recent graduate of Carson-Newman College, has joined the Fundamental Research Section of the Carbon Black Technical Department as a junior chemist. Richard F. Heitmiller, who recently joined the New Products Research Department staff, has been appointed group leader of polymer research. Adam Orzechowski, with the Cabot organization since 1957, has been appointed group leader of catalysis research in the Organic and Polymer Research Section of the New Products Research Department. Charles I. Tewksbury, who joined Cabot in 1959, has been named group leader of organic research in the Organic and Polymer Research Section of the New Products Research Department. Henry Wigton, previously owner of Wigton Development, Louisville, Colo., has joined the company as group leader in the Applied Research Section of the New Products Research Department.

Quinn Joins Reeves

► David W. Quinn has joined the Vulcan Rubber Products Division of Reeves Brothers, Inc., New York, N. Y., as manager of the company's Grace plant near Rutherfordton, N. C. Reactivation of the Grace plant, which will produce vinyl-coated fabrics, marks Reeves' entry into the vinyl-coating field. Mr. Quinn formerly served for 13 years with the Empire Division of Hettrick Manufacturing Co., Statesville, N. C., where he was vice-president in charge of coated fabrics. He attended Northeastern University and served during World War II as a pilot with the Army Air Corp. Before joining Hettrick, he was with the H. M. Sawyer Co., Watertown, Mass.

N. L. Smith

Joins Research Staff

► Dr. Norman L. Smith, previously an associate professor at the School of Mines and Metallurgy at the University of Missouri, has joined the United Carbon Co., as a projects group supervisor in the Research Department. He will be located at the Borger, Texas, research laboratory of United Carbon. The company states that Dr. Smith's experience in experimental process and production design and analysis coupled with his work on metals, gases and synthetic polymers will extend its research depth considerably. While at the University of Missouri, Dr. Smith supervised an Atomic Energy Commission sponsored thesis work on rapid gas phase reactions. Dr. Smith is a graduate of the University of Arkansas and received his doctorate in chemical engineering from the University of Minnesota. He is a member of the American Chemical Society and the American Institute of Chemical Engineers.

An index to Volume 86 of RUBBER AGE will be found on pages 173 to 176 of this issue.

Tuthill Named Bishop President

► Newton H. Tuthill has been named president of the Bishop Manufacturing Corp., Cedar Grove, N. J., and its subsidiary, the Peters Manufacturing Co., while Pendennis W. Reed, president, has become chairman of the board. Before joining Bishop, Mr. Tuthill was vice-president of Amerace Corp. and president of the American Hard Rubber Co. of Butler, N. J., a subsidiary. In 1937, he joined American Hard Rubber and in 1954, he became executive vice-president and general manager of its wholly owned subsidiary, the Pequanoc Rubber Co.

Mr. Tuthill was named vice-president of Amerace and president of American Hard Rubber in January, 1957. He is a member of the board of Bishop and Peters and was a board member of Pequanoc. He was American Hard Rubber's representative to the Rubber Manufacturers Association. Mr. Tuthill was graduated from Norwich University in 1935 with a B.S. degree and from Harvard University School of Business Administration in 1937 with an M.B.A. During World War II, he was an Army Major in the Air Corps Finance Department during the African and European campaigns.

Beacon Introduces Ozono

► Beacon Chemical Industries, Inc., Cambridge, Mass., has introduced a new product called Ozono, a synergistic blend of antiozonants, antioxidants and anti-suncheck agents, for the protection of rubber goods from weather and flex cracking. According to the company, advantages of the product are that it affords greater protection against elements of weather and flex cracking; disperses readily in rubber stock and fuses quickly; offers many comparative cost advantages; and is an "all-in-one" compound requiring no additional anti-suncheck agent. The material finds use in tire carcass, inner tubes, footwear, molded heels and soles, sundries, sponge, automotive rubber, wire insulation and other products.

H. J. Sullivan

G. R. Moore

Join Harwick Standard Sales Force

► Henry J. Sullivan and G. Robert Moore have joined the sales organization of Harwick Standard Chemical Co., Akron, Ohio. Mr. Sullivan will work out of the firm's Boston, Mass., office and Mr. Moore will be located in, and responsible for, the San Francisco Bay area. Mr. Sullivan is a graduate of Northeastern University. He previously was associated with Dewey & Almy Chemical Division; Heveatex Corp.; and Dicks-Armstrong-Pontius, Inc. Mr. Sullivan is a member of the American Chemical Society; Division of Rubber Chemistry, ACS; Elastomers & Plastic Group, Northeastern Section; Boston Rubber Group; and Connecticut Rubber Group. Mr. Moore is a graduate of Kent State University with a B.S. degree in chemistry. Prior to joining Harwick Standard, he was in sales training and sales work for the General Chemicals Department of B. F. Goodrich Chemical Co. Mr. Moore is a member of the American Chemical Society and the Division of Rubber Chemistry of the American Chemical Society.

General Aniline Names Three

► General Aniline and Film Corp., New York, N. Y., has announced three new appointments in the Development Department including Dr. F. A. Hessel as manager of commercial research; Dr. W. W. Williams as manager of foreign liaison; and Miss J. M. Moran as senior development specialist. The newly created Development Department was established to assist the corporation's management committee and the president of the corporation in the operations of the company.

Dr. Hessel had been commercial research manager of the Commercial Development Department of the Dyestuff & Chemical Division of General Aniline since 1953. Dr. Williams was formerly foreign technical representative for the Dyestuff & Chemical Division, serving in that division for 17 years in various research and marketing capacities. Miss Moran was formerly supervisor, technical service, in the Dyestuff & Chemical Division's Commercial Development Department and has been associated with the company for 17 years.

Boston Group Holds Ski Outing

► The Boston Rubber Group held its Annual Ski Outing on the week-end of February 5 to 7 at the Bartlett Inn in Bartlett, N. H., with 97 members and guests in attendance. James J. Breen (Barrett and Breen), chairman of the Boston Rubber Group, served as outing chairman. The program for the week-end included skiing at Black Mountain, Cranmore Mountain, Thorn Mountain and the new Wildcat Trail development in Pinkham Notch. Novice skiers were given ski instruction by Norman Torgerson, a qualified amateur ski instructor, on the slopes of Cranmore Mountain. On Saturday evening, February 6, the group enjoyed viewing a film which showed the trials for the Olympic ski team which took place on Wildcat Trail.

An index to Volume 86 of RUBBER AGE will be found on pages 173 to 176 of this issue.

Washington Group Holds Meetings

► The Washington Rubber Group held a technical meeting on February 18 at the Army and Navy Club, Washington, D. C., at which Ted L. Thome (General Tire) gave a talk on "The Use of Rubber Grippers and Flatbags in Offshore Platforms." The group also held a technical meeting on January 20 at the National Press Club. Featured speakers at this meeting were Dr. W. J. Sparks (Esso Research), who discussed "Recent Advances in Butyl Rubber," and A. M. Gessler (Esso Research), who spoke on "The Role of Carbon Black."

In his presentation on February 18, Mr. Thome spoke of the conception, design, development and typical field applications of rubber grippers and flatbags. Mr. Thome's account of their use in conjunction with the DeLong Corp. caisson jacks showed how a versatile engineering capability was combined with unique metal construction know-how to produce a revolutionary off-shore technique in oil drilling operations and pier or breakwater installations. Mr. Thome showed photographic slides depicting typical offshore applications using grippers and flatbags. He also showed a sound color movie of the Texas Tower No. 2 Advance Radar Station installation.

At the January 20 meeting, Dr. Sparks gave a brief talk on the butyl tire, and presented a movie which showed the progress which has been made in the development of a commercial butyl tire. Mr. Gessler, in his talk, presented background information on methods of activating butyl rubber-black systems now in commercial use. He told about the new development involving the changes in properties which accompany the attrition of carbon black by various techniques.

Cooper Tire Leases New Plant

► Cooper Tire & Rubber Co., Findlay, Ohio, has leased a plant of approximately 140,000 square feet at Auburn, Ind., which was formerly occupied by the Auburn Rubber Co. Cooper expects to start production operations there in the very near future. Expanding sales of both tires and industrial rubber products produced at Findlay have created a need for additional production facilities. The Findlay plant is presently being expanded for additional tire production. Inner tube and camelback requirements are produced at the company's plant in Clarksdale, Miss. The Auburn plant is equipped to manufacture industrial rubber products and will enable Cooper to more than double production of these items. The company has also obtained an option to purchase this plant at any time during the term of the lease on favorable terms.

W. V. Shakespeare

Cincinnati Rubber Names President

► William V. Shakespeare has been appointed president of the Cincinnati Rubber Manufacturing Co., Cincinnati, Ohio, succeeding L. P. Darnell, who has retired. Mr. Shakespeare joined the Thor Power Tool Co., Aurora, Ill., in 1936 following graduation from Notre Dame University. He transferred to the Cincinnati concern, which is a division of Thor, as assistant to the president in 1956 and became vice-president last year.

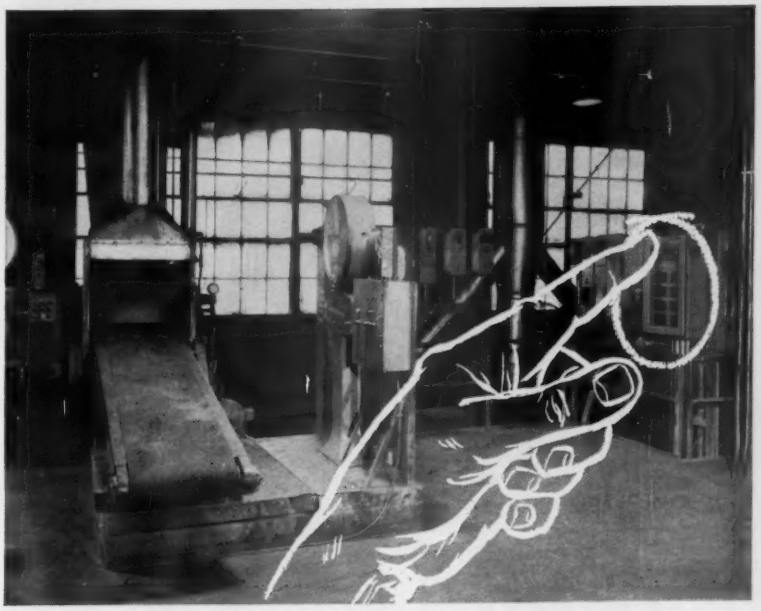
Two New Ameripol Rubbers

► Goodrich-Gulf Chemicals, Inc., Cleveland, Ohio, has announced that advanced engineering work is under way toward the commercial production of two new synthetic rubbers, Ameripol SN rubber (polyisoprene) discovered by the company in 1954, and Ameripol CB (*cis*-polybutadiene) rubber, an even more recent devolopment. It is anticipated that both of these rubbers will be produced interchangeably in the same commercial plant facility. The company, which is jointly owned by the B. F. Goodrich Co. and Gulf Oil Corp., anticipates an initial commercial plant with an annual capacity of about 25,000 tons. Plant sites now under consideration include two presently owned locations in Orange County, Texas, and Institute, West Va. The unit is expected to be completed by late 1961.

TB&CC Promotes Leach

► C. E. Leach, formerly director of industrial relations, has been elected vice-president, industrial relations, for the Texas Butadiene & Chemical Corp. He will have his headquarters in Houston, Texas. A native of Michigan, Mr. Leach received his master's degree from the University of Michigan. He joined Texas Butadiene & Chemical Corp. in 1955 as director of industrial relations. Mr. Leach was previously with Celanese Corp. of America as personnel superintendent in the Chemical Division.

AT LEE RUBBER & TIRE CORP. THE OPERATOR PUSHES A BUTTON...



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*Trade-Mark

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Northam Retires From DuPont

► Alfred J. Northam, who had a major share in bringing DuPont's Hypalon synthetic rubber to its present stage of commercial development, has retired from the company after a career of 36 years in the rubber industry. Assistant sales manager in charge of Hypalon sales for the past three years, Mr. Northam spent the major part of his DuPont career at the Rubber Laboratory. Mr. Northam received a B. S. degree in chemistry from the University of Maryland in 1922, and prior to joining DuPont he was with the U. S. Rubber Co. and the Pennsylvania Rubber Co. Starting in 1927 as a chemist for the former Grasselli Chemicals Co. before it became a part of DuPont, he was transferred to the Rubber Laboratory at Deepwater Point, N. J., in 1929 and was named assistant director there in 1943. In 1953 he was appointed assistant to the sales manager of rubber chemicals in Wilmington, Del., and in 1957 was named to his retiring position of assistant sales manager, Elastomer Chemicals Department, in charge of Hypalon sales. Mr. Northam is a member of the Rubber Division, ACS, the American Chemical Society, the New York Rubber Group and the Philadelphia Rubber Group.

Bridgewater Closing Akron Plant

► Bridgewater Machine Co., Akron, Ohio, has announced that it will close down its Akron plant upon completion of present contract work. According to the company, the decision to close the Akron plant, located in Springfield Township, does not affect its facilities at Athens, Ohio, and the operation of its Canadian subsidiary, Bridgewater Machine Co. of Canada, Ltd., in Brantford, Ontario. The Akron plant specialized in the manufacture of heavy structural aircraft components and assemblies for national defense. A steady decline in recent years of conventional aircraft for defense in favor of missiles and rockets was responsible for the closing decision, the company states. About 150 persons will be affected by the closing, which will take place between June and August 1960. The company will continue to maintain its principal offices in Akron.

Cash Awarded For Suggestions

► Firestone Tire & Rubber Co., Akron, Ohio, reports that its employees received a total of $49,389.55 for 2,423 new suggestions adopted by the firm during 1959. The cash awards were made to employees in Firestone's plants and offices throughout the United States, Canada and five other countries. According to the company, more than $1,200,000 has been paid out to employees since the suggestion system was established in 1918.

William H. Jefferson

Promoted by General Latex

► General Latex & Chemical Corp., Cambridge, Mass., has announced the appointment of William H. Jefferson as vice-president, general sales manager. Mr. Jefferson joined the company in 1956 as district sales manager of the Ashland, Ohio, subsidiary. In 1957, he became general manager of that plant and in 1958, moved to the Cambridge, Mass., offices as assistant to the president. His appointment to vice-president in charge of sales is part of a reorganization of the General Latex & Chemical sales staff brought about by the addition of several new products to its product line.

General Latex has entered the plastics field with a line of urethane foams and coatings, and the adhesives fields, with urethane, latex, resin and dextrine adhesives. To help promote these products H. G. Brousseau has been named technical sales manager, compounds and dispersions; R. V. Does, technical sales manager, natural and synthetic latices; and J. B. Blomstrom, technical sales manager, urethane foams.

Pelmor Viton Based Solutions

► Pelmor Laboratories, Inc., Newtown, Penna., is offering solutions based on Viton synthetic rubber in a variety of colored and black solutions. According to Pelmor, the excellent heat resistance, ozone resistance, and resistance to oils, fuels, solvents and other fluids for which Viton is noted can now be imparted to insulations and coatings where molding is not desirable or physically possible. Viton-based solutions in yellow, red, green, blue, neutral, gray and black are available in five-gallon, one-gallon and quart containers. Suggested applications are in the areas of caulking, sealants, coatings, commercial fabric linings, wire insulation, color-coding and others. Pelmor also has available standard proprietary compounds based on Viton for mechanical goods requirements which demand fluorocarbon elastomers.

Nopco Chemical Names Three

►Nopco Chemical Co., Newark, N. J., has announced the appointment of Benjamin S. Collins as general manager of its Plastics Division at North Arlington, N. J. The company also announced the appointment of John N. Gulick as general sales manager of the Plastics Division and Richard A. Singer as manager of flexible foam sales. Mr. Collins, a graduate of Lehigh University, joined Nopco in 1953 in the Plastics Division. Since 1956 he has served as manager of system sales. In his new post, Mr. Collins will be responsible for sales, production and the laboratories of the Plastics Division.

Mr. Gulick, a graduate of Rutgers University, will be responsible for all sales activities connected with Nopco flexible foam and foamed-in-place systems. Prior to joining Nopco in 1955, he was associated with Redmond Distributors, Inc. and Standard Brands, Inc. Mr. Singer, who will be responsible for national sales of flexible polyether and polyester foam, is a graduate of the University of Maine. Prior to joining Nopco in 1955, he was with Farnsworth Fibre Corp. and American Latex Fiber.

Balzersen Named Plant Manager

► B. F. Goodrich Chemical Co., Cleveland, Ohio, has appointed Gerald A. Balzersen plant manager of its vinyl resin plant at Niagara Falls, N. Y., succeeding P. H. Lawrence, who has been transferred, as plant manager, to the vinyl resin and compound plant under construction near Long Beach, Calif. Mr. Balzersen joined Goodrich in 1943 as safety engineer at the Port Neches, Texas, synthetic rubber plant operated by the company for the government. In 1947, he was named safety and training director for Goodrich Chemical with headquarters at Louisville, Ky. He was appointed manager of industrial relations for the company's plant at Institute, West Va., in 1950 and in 1952, he was named operations manager at the firm's Avon Lake Development Center.

Campaigns to Increase Tyrex Use

► Beaunit Mills, Inc., New York, N. Y., has undertaken a campaign "to get" truck fleet operators to demand Tyrex tires. Practically all original equipment tires on 1960 automobiles are made with Tyrex, but nylon is used widely in truck tires. Beaunit, which disclosed plans earlier to make nylon tire yarn also, will start production at the rate of 2,500,000 pounds a year. Concerning rayon and nylon tire yarn, I. Rogosin, president and chairman of the firm, said he did not know which Beaunit would put all its "weight on" in coming years. For the time being, Beaunit will supply both types.

Polymer Completes New Unit

► Polymer Industries, Inc., has reported that its new $500,000 production and laboratory facility in Springdale, Conn., was completed at the end of 1959. Work has also begun on additional construction, including a new polymerization plant and a new solvent-mixing plant, to be located at the company's present site. Estimated cost of the new facilities is also $500,000. Executive offices are located in the building expansion just completed, as are the enlarged laboratory and production areas. The newly expanded production facilities are geared to the rapid growth of activity in the adhesives industry.

The firm anticipates a continuing upward trend in the field, based upon the new and expected technological demands that the packaging, textile and other big industries are now making. The new polymerization and solvent mixing plants on which construction has now begun, are scheduled to begin operations next summer. The former will produce certain raw materials and will allow for expanded development work for Polymer Industries' own specialty polymers for the adhesives and textile markets. The new mixing plant will enable the company to complement its aqueous line of adhesives with an expanded line of solvent adhesive laminants.

Merix Introduces Anti-Statics

► Merix Chemical Co., Chicago, Ill., has introduced two new chemical antistatics for use with rubber and hard surfaced plastics including Merix Anti-Static No. 79 and Merix Anti-Static No. 79-OL. The company states that Merix Anti-Static No. 79 applied to any metal or plastic surface removes electrostatic-caused charges and keeps such surfaces dust free. Merix Anti-Static No. 79-OL applied on industrial conveyor belts as well as to carpets in executive offices, etc., removes static-caused shocks. Due to their dust-repelling feature both products also cut maintenance cost and make an important contribution to industrial safety and more attractiveness of consumer items, according to Merix.

Gordon Re-Elected President

► Ben Gordon (A. Schulman) was re-elected president of the Scrap Rubber & Plastics Institute at its meeting on March 14, during the 47th Annual Convention of the National Association of Waste Material Dealers at the Waldorf-Astoria Hotel in New York City. Other officers for the 1960-1961 term are: *Vice-President,* Sidney Freedman (H. Muehlstein) and *Secretary,* Si Wakesberg (NAWMD). The institute's meeting consisted of an open forum discussion which covered the outlook for scrap rubber and plastics in the 1960's, as well as industry conditions today.

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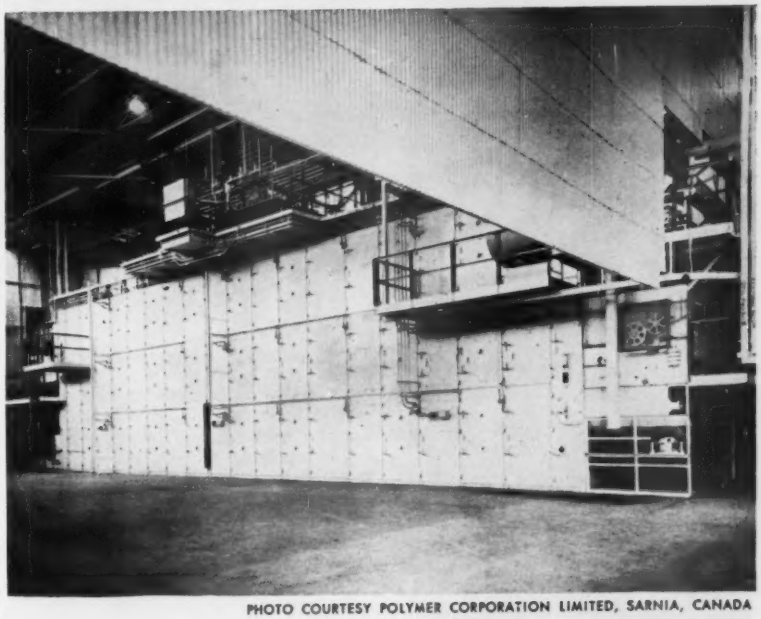

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J. H. Rines

Named Manager by Pitt-Consol

► J. H. Rines has been named manager of rubber chemical sales for Pitt-Consol Chemical Co., Newark, N. J. In his new post, Mr. Rines will be responsible for domestic and foreign sales of the firm's line of rubber chemicals. Mr. Rines is a graduate of Cornell University with a B.S. degree in chemistry. Prior to joining Pitt-Consol in 1956, he was associated with B. F. Goodrich Co., Flintkote Co., and Pioneer Latex Co. He is a member of the New York Rubber Group and the American Chemical Society.

Huisking Celebrates Anniversary

Chas. L. Huisking & Co., Inc., New York, N. Y., celebrated its fiftieth anniversary in the chemical industry on January 1, 1960, by announcing a broad product development program for the coming year. A long time importer-exporter and distributor of drugs and chemicals, the firm has recently begun producing specialty products, such as sorbitan fatty acid esters and polyoxyethylene derivatives for the synthetic rubber market.

These and other industrial chemicals are manufactured by Huisking's Glyco Chemicals Division plant at Williamsport, Penna., acquired as a subsidiary in 1958. During the past year, over $500,000 has been invested in new plant facilities and 50 per cent more space added for research and development activities. Research is being focused on derivatives of both hydrogen cyanide and ethylene oxide.

Cabot Regal Blacks

► Godfrey L. Cabot, Inc., Boston, Mass., has introduced what is said to be an entirely new and different family of carbon blacks, offering properties never before available. Trademarked name of the family of three new blacks is "Regal." Individually, they are called Regal 300, Regal 600 and Regal SRF. Complete details on the new blacks will appear in the May issue of this journal.

International Symposium Deals with Tire and Road Problems

► The International Symposium held at the Institut Francais du Caoutchouc, Paris, France, featured 23 papers on the subject of "Tire and Road Problems." The six-session symposium, which was attended by approximately 200 persons from 18 countries, covered *Tire Dynamics, Sliding Wear, Rolling Resistance, Special Tires* and *Tests.*

Session on Dynamics

In the first session on *Tire Dynamics,* the following papers were presented: "Interaction Between Tire and Road During Straight-Line Driving," by Dr. W. Hofferberth (Deutsche Dunlop Gummi); "The Dynamic Stiffness of Tires," by A. Chiesa and G. Tangorra (Pirelli); "Sideforce and Slip in the Tire Contact Patch," by D. H. Cooper, V. E. Gough and J. H. Hardman (Dunlop Research Center); "Strain Measurements on Tires by Means of Strain Gauges," by W. F. Kern (Metzeler Gummiwerke); "Deformations of Tire Elements during Rolling," by Dr. V. L. Biderman (Institut de Recherches sur les Pneumatiques de Moscou); and "The Tire and Its Performance on the Vehicle and the Rolling Surface," by Dr. M. Mitschke (Institut für Fahrzeugtechnik).

Session on Sliding

Nine papers were presented at the session on *Sliding,* including: "Observations on the Behavior of Tires Close to or Over Adhesion Limit," by M. A. Julien (Societe Paulstra); "The Friction of Rubber on Lubricated Rough Surfaces," by Dr. D. Tabor (Research Laboratory for the Physics and Chemistry of Solids); "Recent Investigations on the Role of Rubber Hysteresis on Skidding Resistance Measurements," by C. G. Giles and Miss B. E. Sabey (British Road Research Laboratory); "Device for the Study of the Influence of Tires upon the Slip Coefficient," by J. L. Escario and A. Lleo (Laboratorio del Transporte y Mecanica del Suelo); "Relation between the Non-Skid Properties of a Road Surface and the Height and Number of Sharp Projections," by A. J. P. Van der Burgh and D. H. F. Obertop (Laboratoire Gouvernemental de la Route); "Tire and Road," by Professor R. Ariano (Istituto Sperimentale Stradale del Touring Club Italiano); "Special Observations on the Resistance to Sliding on Snow-Covered or Icy Road Surfaces," by Professor B. Wehner (Technische Universität); "A Study on Slippage Carried Out at the Belgian Road Research Center," by J. Daube (Centre de Recherches Routieres); and "Methods and Types of Devices Used to Measure Road Slipperiness," by G. Mathieu (Association Internationale Permanente des Congres de la Route).

"The Mechanism of Tire Wear," by Dr. A. Schallamach (British Rubber

Producers' Research Association), was presented at a session on *Wear*.

Rolling Resistance was the topic of the fourth session, at which the following papers were presented: "The Resistance to Rolling of Airplane Tires," by Ch. Birot (Etablissement Aeronautique de Toulouse); "Tires for Saharian Vehicles," by E. Chapoux (Laboratoires de l'U. T. A. C.); and "Passenger Tire Rolling Resistance at High Speeds," by V. I. Novopolsky (Institut de Recherches sur les Pneumatiques de Moscou).

In a session on *Special Tires,* two papers were presented: These were "Testing Tractor Tires. Influence of Carcass Structure," by C. Mazza and L. Amici (Pirelli); and "Behavior of Supersonic Plane Tires at High Temperatures," by Ch. Birot (Etablissement Aeronautique de Toulouse).

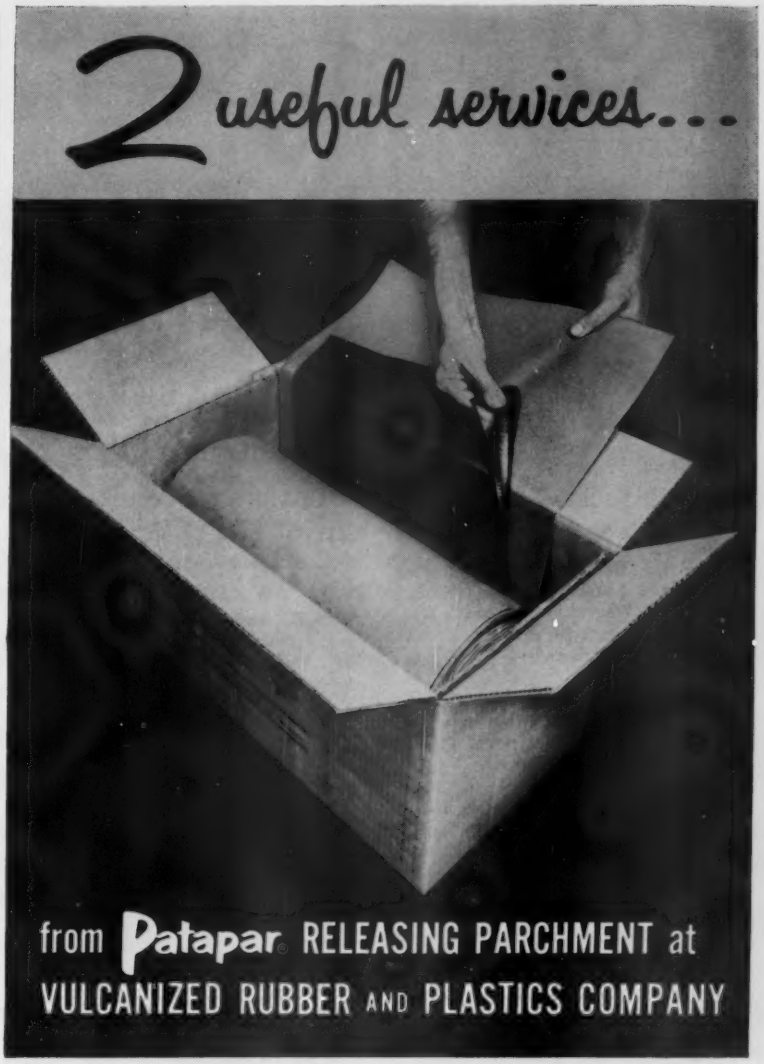
The following papers were presented at the final session on *Tests*: "Laboratory versus Road Testing. Effect of Tires on Vehicle Perofrmance," by W. Johnson (Goodyear); and "New Testing Machine for the Study of Tires," by Dr. K. Kollmann (Technische Hochschule Fridericiana).

Ohio Rubber Promotes Bourquard

► Alex B. Bourquard has been promoted to vice-president-controller of the Ohio Rubber Co., Willoughby, Ohio, a division of the Eagle-Picher Co. Born in Marietta, Ohio, Mr. Bourquard was graduated from Taylor University with a B.A. degree, was awarded an M.B.A. degree at the Western Reserve University and later attended Columbia University Management School. He began his career with the company in 1932, was appointed assistant treasurer in 1944 and in 1955 was named treasurer. Mr. Bourquard has served as division controller for the company since 1958. A Certified Public Accountant since 1949, he is a member of the Controller Institute of America, the Ohio Society of C. P. A. and the Graduate Business Association of Western Reserve University.

Plastic Wire & Cable Names Six

► Marvin H. Phillips, president of Plastic Wire & Cable Corp., Jewett City, Conn., has announced the promotions of six of the company's key executives. Herbert W. B. Farr has been promoted from vice-president and sales manager to executive vice-president; James T. Daly, formerly assistant sales manager, has been named vice-president and sales manager; George H. Lane, previously assistant treasurer, has been appointed treasurer; James E. Flood, technical director, has been named vice-president and technical director; Gordon H. Sigman, purchasing agent, has been appointed vice-president and purchasing agent; and J. Vincent McBride, previously chief engineer, has been named vice-president and development director.



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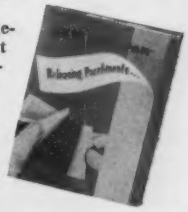

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Names in the News

William F. Twombly, former vice-president and director of Witco Chemical Co. and a consultant for the company, has retired.

Clark L. Wilson, vice-president of New Park Mining Co., Keetley, Utah, has been named chairman of the Emergency Lead-Zinc Committee and will be headquartered in Washington, D. C.

Jerome D. Post has been appointed marketing research manager of Latex Fiber Industries, Inc., Beaver Falls, N. Y.

Vaughn V. Wheeler has been appointed chief chemist of Frank G. Schenuit Rubber Co., Baltimore, Md., succeeding **Clinton H. Schultz,** who has retired. **Elsworth J. Weaver** has joined the company as a chemist for product development and production.

R. W. French, Henri de Roubin, A. G. Treadgold and **H. B. Lawson** have been appointed directors of United Carbon France S.A., Rouen, France.

Joseph C. Nelson, Jr., has been named sales manager of the Calcium Products Division of Georgia Marble Co., Atlanta, Ga., and **Robert F. Hall,** technical service director of the Calcium Products Division, has been put in charge of the division's Quality Control Department.

Richard B. Steinmetz, president of Anaconda Wire & Cable Co., has been elected a director of American Brass Co. and Anaconda Aluminum Co.

Jack Arnold, Jr., has been named marketing coordinator for the Butyl Division of Enjay Co., Inc., New York, N. Y.

W. J. Smith has been appointed manager of the Hopewell, Va., synthetic fiber plant of Firestone Synthetic Fibers Co.

W. C. Gilbertson has been appointed sales manager of the Foam Products Division of Hewitt-Robins, Inc., Stamford, Conn., and **C. A. Maher** has been named assistant sales manager of the division, with headquarters in Franklin, N. J.

J. C. Baker, previously chief chemist for Castle Rubber Co., East Butler, Penna., has joined International Latex Corp., Dover, Del., as project manager of dry polymer development.

Gale M. Hallett has been named sales manager for Charleston Rubber Co., Charleston, S. C.

George J. Webster has been elected president and general manager of United Carbon France S.A., Rouen, France, and **John Bahm,** international sales manager for United Carbon Co., Inc., New York, N. Y., has been named a vice-president of the French subsidiary.

James L. Killian has been appointed project engineer in charge of the Tire Technical Section of International B. F. Goodrich Co., Akron, Ohio.

H. E. Humphreys, Jr., chairman of the board of U. S. Rubber Co., New York, N. Y., has been named rubber industry chairman of the $3.5 million Golden Anniversary Boy Scout Capital Camp Campaign.

Alex T. Sturrock has been appointed senior development engineer, new products development for Goodrich-Gulf Chemicals, Inc., Institute, West Va.

Harold W. Catt, previously general manager of the rocket motor plant of B. F. Goodrich Aviation Products Co., Rialto, Calif., has been named corporate director of purchases and traffic for B. F. Goodrich Co., Akron, Ohio.

Homer H. Ewing has retired from the Development Department of DuPont, Wilmington, Del., after 42 years with the company.

Edgar F. Whitmore has been named manager of industrial chemical sales for Collier Carbon & Chemical Corp., Los Angeles, Calif.

Dr. Paul S. Stutsman, formerly assistant to the president of Texas-U. S. Chemical Co., Port Neches, Texas, has been appointed manager of the firm's butadiene operations.

William Morehouse has been named senior engineer at the Akron, Ohio, chemical plant of B. F. Goodrich Chemical Co.

Thomas M. Bancroft has been elected a director of Western Electric Co., New York, N. Y.

D. S. Hamilton, previously sales engineer for American Hard Rubber Co., Akron, Ohio, has been named manager of the firm's industrial product sales with headquarters in Butler, N. J.

Lt. Gen. Manual J. Asensio (USAF-Ret.) has been named chief executive officer of Texas Butadiene & Chemical International Ltd., Argentina.

Franklin A. Leach has joined Jade Rubber Corp., Pawtucket, R. I., as vice-president in charge of sales, with headquarters in New York City.

Eugene I. Owens, formerly eastern division sales manager, has been appointed manager of manufacturer sales for Firestone Rubber & Latex Products Co. **Robert O. Willis,** formerly sales promotion manager, has been named manager of distributor sales for the company.

Arthur L. Hall, previously manager of the Mineral Division operation of Godfrey L. Cabot, Inc., has been transferred to the firm's Foreign Operations Division. **David D. Munsell** has been appointed acting manager of the Minerals Division operations.

J. R. Stitt has been named sales manager of the newly organized Petroleum and Rubber Chemicals Division of Oronite Chemical Co.

Clyde E. Schetter, previously assistant manager of the Public Relations Department of Goodyear Tire & Rubber Co., has been named by Goodyear as its western manager of public relations. **Thomas J. Allison** has been named to succeed Mr. Schetter as assistant manager of public relations.

Jack D. Gunther, vice-president of Air Reduction Co., Inc., has been elected to the board of directors of the Rubberoid Co.

John R. Hodson has been appointed associate director of the Development Department of Texas Butadiene & Chemical Corp. **Erhart K. Drechsel** has been named associate director of the Development Department, and **Ernest W. Kirchheimer** has been appointed senior process economist in the Development Department.

M. G. O'Neil, vice-president and executive assistant to the president of General Tire & Rubber Co., and **Henry M. Fawcett,** president of Mohawk Rubber Co., have been elected to the board of directors of the First National Bank in Akron, Ohio.

Raymond E. Christian has been named sales representative in Tehran, Iran, for the International B. F. Goodrich Co. Later this year, Mr. Christian will become manager of B. F. Goodrich Iran, S.A.

Charles A. Church has been appointed sales promotion manager for the Firestone Synthetic Rubber & Latex Co.

Dennis Lietz has joined Colton Chemical Co., as a research chemist in the Polymer Section.

J. C. Baker, formerly chief chemist at Castle Rubber Co., has joined International Latex Corp. as project manager in dry polymer development.

Carl W. Virgin has been named marketing coordinator—plastics for the Enjay Co., Inc.

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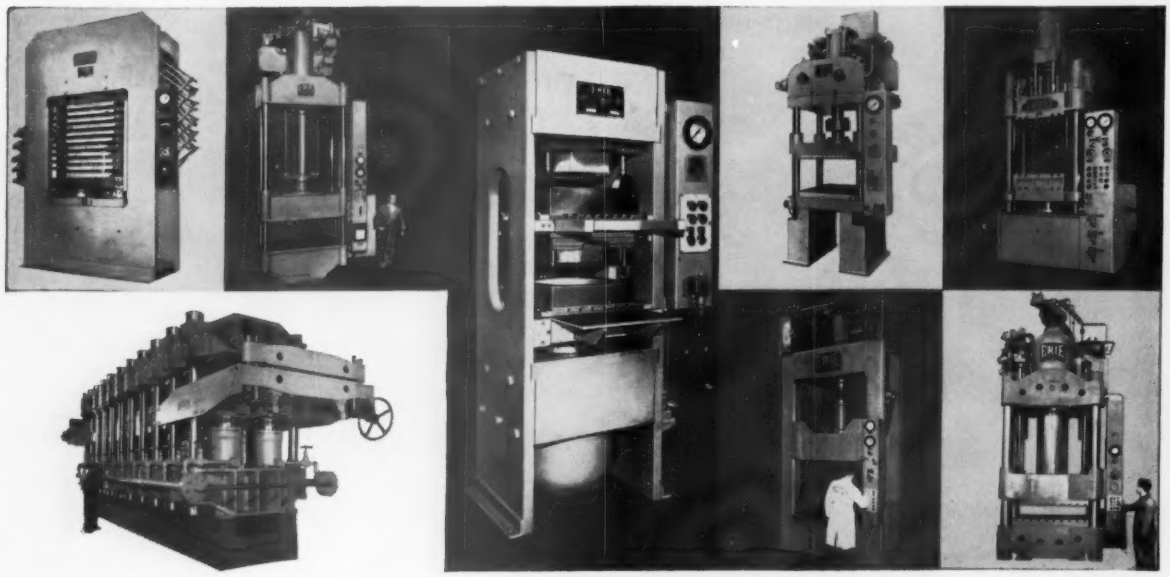

R. H. Taylor

Appointed Sales Manager

► Rolla H. Taylor, formerly assistant sales manager, has been appointed sales manager for Scott Testers, Inc., Providence, R. I. Mr. Taylor, in his new capacity, will have charge of sales of Scott testing equipment to the rubber, textiles, paper, leather, plastics, wire and leather industries throughout the United States and in over 60 foreign countries. His experience, particularly in the field of elastomeric technology, includes some 20 years with the National Bureau of Standards as rubber technologist. He joined Scott in 1953 as a sales engineer. In 1958, he became assistant sales manager. Mr. Taylor is a member of Committees D-11, D-20, and E-1 of the American Society for Testing Materials; the Rubber Division, ACS; the Chemists Club; and the Providence Engineering Society.

Dow Corning Overseas Subsidiaries

► Dow Corning Corp., Midland, Mich., has formed two overseas subsidiaries, Dow Corning A. G., located in Basel, Switzerland, and Dow Corning International, S. A., in Panama. Formation of these subsidiaries is part of a Dow Corning program to reorganize enough foreign business to facilitate service to licensees and customers abroad. Dow Corning, A. G., will have a paid-in capital of 2,000,000 Swiss francs (about $460,000) and will finance and manage certain overseas company interests but will not engage in manufacturing operations in Switzerland. Dow Corning International, S. A., will handle the overseas sales and services of company silicone products.

Dayton Rubber Changes Name

► Stockholders of Dayton Rubber Co., Dayton, Ohio, have approved a proposal to change the firm's name to Dayco Corp. The company reports that because of the more diversified character of its business it was deemed necessary to remove the limiting implication of its corporate name.

Develops New Tread Rubber

► U. S. Rubber Co., New York, N. Y., has developed a new, shock-absorbing, but tough tread rubber that is said to give tires a smoother, quieter ride and up to 25 per cent more mileage than tires made with the previous tread stock. According to the company, the new rubber has completely reversed tire-building concepts. Before this development, passenger tires were made with stiff rubber treads to give wear, and a more flexible rubber in the carcass or body of the tire to cushion the ride.

The new replacement and original equipment tires for 1960 cars have the new rubber in the tread to absorb road irregularities and eliminate harshness of ride, and a stiffer rubber in the body to give added stability and safety. It is claimed that the new tires have less squeal and "sing" than tires made with previous tread stock. The company states that engineering improvements in the processing and curing of tires by U. S. Rubber made it possible to adopt the new, more flexible rubber compound. These are advanced Bagomatic curing machines which place less strain on the raw tire during the tire shaping process, and pressure tempering, a method of "relaxing" the tire after it has been removed from the mold, thus eliminating groove cracking.

Mitchell Named Plant Manager

► Ewell E. Mitchell has been appointed plant manager of the Institute, West Va., plant of Goodrich-Gulf Chemicals, Inc., succeeding F. C. Hands, who has been transferred to the company's administrative offices in Cleveland, Ohio. Mr. Mitchell formerly served the Port Neches, Texas, plant of Goodrich-Gulf, where he had been production manager since 1953. A 1932 graduate of Rice Institute, where he received a degree in chemical engineering, Mr. Mitchell joined a major petroleum company immediately after graduation. He joined the Port Neches plant in 1943 as a senior technical man and later filled various supervision assignments before becoming the plant's production manager. Mr. Mitchell is a member of the American Institute of Chemical Engineers and the American Chemical Society.

Producing Polymer Dispersions

► Polymer Dispersion, Inc., Fairport Harbor, Ohio, has announced that it has installed production equipment for polymer color concentrates and dispersions. The company reports that research and development will be handled at its laboratories, but customer service and color matching will be carried out at the Akron laboratories of Harwick Standard Chemical Co. Harwick Standard will also handle sales under its Stan-Tone trade name, the company states.

R. H. Marks

Named Executive Vice-President

► Raymond H. Marks, previously vice-president in charge of sales, has been appointed executive vice-president of Cary Chemicals, Inc., East Brunswick, N. J. His new duties will include the coordination of all manufacturing, research and sales activities of Cary Chemicals. Mr. Marks is a graduate of North Carolina State College. Prior to joining Cary Chemicals he was associated with Monsanto Chemical Co., in various research, production and sales capacities.

Poly-Phen S-218 Phenolic Resin

► Plastics Division of National Polychemicals, Inc., Wilmington, Mass., has developed Poly-Phen S-218, which is said to be an entirely new phenolic resin for use in light colored compounds based on natural rubber and styrene-butadiene copolymers. The company states that Poly-Phen S-218, as compared with resins presently on the market, will impart substantially lighter color and better color stability while providing good reinforcement. The resin is reported to develop a high degree of hardness and stiffness of most molding compounds without increasing the specific gravity of the vulcanizate. It is being marketed in uncatalyzed flakes and powder as well as in catalyzed powder form. Poly-Phen S-218 is especially recommended in compounding of composition soles, top lifts and miscellaneous mechanical goods. A technical bulletin is now available from the company.

Armour Appoints Strain

► Armour Industrial Chemical Co., Chicago, Ill., has announced the appointment of Robert Strain as industry manager for polymer and surfactant chemicals. Mr. Strain will be concerned with the commercial development of such Armour chemicals as industrial emulsifiers and specialized processing aids for rubber and other high polymers. Mr. Strain has been with Armour since 1950, when he joined the company as a sales representative.

Shown here is the research laboratory in the new building which was recently opened in Culver City, Calif., by Parker Seal Co.

Parker Seal Opens New Laboratory

► A new laboratory devoted exclusively to specialized seals and sealing problems in aircraft missiles and industry was formally opened recently in Culver City, Calif., by Parker Seal Co. The dedication ceremony of the new research and development laboratory was attended by some 300 businessmen, engineers and industrial leaders from all over the nation, including several board members of the parent firm, Parker-Hannifin Corp., Cleveland, Ohio. The laboratory is housed in a new 20,000 square foot building adjacent to the main headquarters building of Parker Seal at 19567 Jefferson Blvd., Culver City. Among the products manufactured by Parker Seal are O-ring seals for industry and a special line of static seals used for exceptionally efficient sealing of high and low temperature, gases, oils, etc.

Mytkowicz Named Vice-President

► E. J. Mytkowicz has been appointed to the newly-created position of vice-president in charge of operations of the Hewitt Rubber Division of Hewitt-Robins, Inc., Fremont, Ohio. Mr. Mytkowicz joined Hewitt-Robins in 1947 as a project engineer in the Robins Conveyors Division plant in Passaic, N. J. He rose to the position of manufacturing manager of the plant, and in 1956 was appointed manager of operations of the Jones Machinery Division in Chicago. Mr. Mytkowicz earned a degree in mechanical engineering in 1951 by attending evening classes at the Newark College of Engineering. He is a member of the American Gear Manufacturers Association. The company also announced that R. A. Buese succeeds Mr. Mytkowicz as manager of operations in Chicago. Mr. Buese holds a B.S. degree in mechanical engineering from Purdue University and a master's degree in business administration from Northwestern University. He joined the Jones organization as a sales representative in 1953, and in 1956, he was appointed manager of product sales. Mr. Buese is a member of the Iron and Steel Engineers and the American Society of Mechanical Engineers.

du Pont Addresses Washington Group

► James Q. du Pont, a great-great grandson of the founder of E. I. du Pont de Nemours & Co., gave a talk on "Pattern for Success" at the March 16 meeting of the Washington Rubber Group. A heavy snowstorm limited the attendance at the meeting to 22 members and guests. In his presentation, Mr. du Pont attempted to show that there is no secret formula for success in business . . . large, small or medium. He developed ten basic points on a business compass which guided DuPont from a small, one-man operation in 1802 to the large enterprise it is today. Mr. du Pont pointed out that the true north on the DuPont compass has always been fair treatment, right treatment, of people as people. In discussing the elements which usually contribute to business success, Mr. du Pont drew upon the more than a century and a half experience of the DuPont company.

An index to Volume 86 of RUBBER AGE will be found on pages 173 to 176 of this issue.

Glidden Opens New Research Laboratories

► The Glidden Co., a major producer of paints and chemicals, opened a new inorganic research and development center costing over $1 million, on the outskirts of Baltimore, Md., on February 3. The center consolidates the firm's research, product development and technical service facilities for the paper, paint, rubber and plastics industries.

The two-story research center is located at 3901 Hawkins Point Road, adjacent to Glidden's Adrian Joyce Works, one of the country's largest titanium dioxide manufacturing plants. One of its most noteworthy features is a paper making laboratory that contains advanced equipment for reproducing the entire cycle from pulp to testing of coated product in miniature. Fundamental and applied research at this lab and at sponsored university projects will be disseminated to the paper industry as a free service by Glidden, company officials state.

Investigations into paper coating will include technical studies of adhesives such as starch, alpha protein, milk casein and synthetic latices. Latex bases are also being studied in the paint laboratory which combines product control with research and development functions. A third unit, the plastics and rubber laboratory, is concentrating on pigments and their effect on opacity, dispersion and color.

The latest research equipment is in evidence at the laboratories. Color studies are being conducted with a reflectance spectro-photometer, an X-ray system handles analyses of crystalline structures, an electron microscopy unit is engaged in crystal size investigations, and a 13-meter emission spectrograph facilitates rapid chemical analyses. The emphasis of all product development work with these facilities is on the two varieties of titanium dioxide, rutile and anatase.

This work was formerly centered at Glidden's plant in St. Helena, also a suburb of Baltimore, which remains the site of cadmium pigment operations. The company's organic research continues to be done at its Jacksonville, Fla., installation. The new center is eventually slated to become headquarters of product development and technical services exclusively. Glidden has just purchased land near its Cleveland, Ohio, home office, where it plans to erect a central research laboratory.

Herbert L. Rhodes is manager of the new inorganic research and development center. A. C. Dreshfield has been named director of paper research; C. A. Tanner Jr., director of development; Dr. Reuben Roseman, director of research; Richard W. Dye, supervisor of the instruments and plastic-rubber laboratories, and George B. Taylor, director of the paint service laboratory.

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B. A. Vallerga

Joins Golden Bear Oil

► B. A. Vallerga has been appointed director of products engineerings for Golden Bear Oil Co., Los Angeles, Calif. He will supervise and direct the engineering and promotional activities of the company relating to the applications and uses of its varied petroleum products in the areas of soil conservation and highway construction. In addition, he will work in close cooperation with Dr. Fritz Rostler, director of research at Golden Bear Oil. Mr. Vallerga holds an M.S. degree in civil engineering from the University of California. Prior to joining Golden Bear on April 1, he was with the Asphalt Institute as managing engineer for the Pacific Coast Division, and previously had been on the civil engineering faculty of the University of California with the academic rank of assistant professor. Mr. Vallerga is a Fellow of the American Society of Civil Engineers, and a member of the Highway Research Board, American Society for Testing Materials, and the Association of Asphalt Paving Technologists.

Goodrich Building New Tire Plant

► B. F. Goodrich Co., Akron, Ohio, has begun construction on its sixth tire plant on a 350 acre site near Fort Wayne, Ind. The multi-million dollar facility will have 850,000 square feet of floor space and will employ about 1,000 when in full operation. It is being erected to meet anticipated expansion of the tire market during the next five years. Most types and sizes of passenger car, truck and farm implement tires will be produced at the plant. In design for more than three years, the new facility is expected to be the most modern in the world. It will include the latest applications of automation developed by Goodrich and others and will stress quality control methods, the company says. The building, designed to meet future expansion needs, will be a one story structure with one section three stories high.

Naugatuck Building New Center

► Naugatuck Chemical, Naugatuck, Conn., will construct a new technical center near its main plant in Naugatuck to broaden research for new products and speed technical service for customers of its expanding line of chemicals, rubber and plastics. Engineering for the new facility is underway and construction will begin in mid-1960, with completion scheduled for 1961. The new center will have approximately 37,500 square feet of floor space and will be equipped with the most modern machines available for testing rubbers, chemicals and plastics, the company states. The facility will also house equipment on which new products can be produced and tested under operating conditions which simulate actual production line techniques. The center will be staffed with approximately 100 scientists and technicians from the Research and Development Department of Naugatuck. According to the company, the center will be unique in that it will incorporate in both a functional and decorative way many end products which contain the chemical products it manufactures.

Spencer Obtains Process Rights

► Spencer Chemical Co., St. Louis, Mo., has obtained exclusive rights from Vaessen-Schoemaker Co. of Holland, for a fabricating process to make large articles with inexpensive molds from powdered polyethylene. The company reports that it is building a pilot plant at its Orange, Texas, facilities for improving powdered polyethylene, demonstrating the process and giving technical assistance to fabricators. Spencer states that it plans to license the process to fabricators and make and sell powdered polyethylene. The company claims that the new process can be used for the manufacture of large drums, delivery boxes, refuse containers, boats and furniture. The process is presently being used in Europe to produce 500-gallon tanks, 10-foot pleasure boats and molded furniture seats, the company states.

Hudgins Joins Dayton Industrial

► Robert M. Hudgins has been appointed district manager to handle automotive wholesale accounts in the St. Louis sales area, including parts of Illinois and Iowa, for the Dayton Industrial Products Co., Melrose Park, Ill. Mr. Hudgins will be in charge of sales of automotive V-belts, F. H. P. V-belts, radiator and heater hose and car mats manufactured by the company. He was formerly associated with Leader Automotive Supply, where he held the position of branch manager. Prior to that, he was engaged in sales work for 15 years with Koochook Co., Inc., automotive supply house.

C. F. Peterson

Named Manager by Dewey and Almy

► Charles F. Peterson has joined Dewey and Almy Chemical Division, Los Angeles, Calif., as manager of organic chemicals, Western Division. According to the company, Mr. Peterson will be in charge of sales of its vinyl acetate polymers and copolymers, butadiene-styrene latices, plasticizers, and dispersing agents, serving the paint, paper, adhesives, rubber and textile industries in 11 western states. Mr. Peterson received an A.B. degree from the University of Michigan in 1937. Prior to joining Dewey and Almy, he was associated with Carrier Corp., General Electric Co. and U. S. Steel Corp.

Ohio Rubber Plans New Unit

► Ohio Rubber Co., a division of Eagle-Picher Co., Cleveland, Ohio, plans to begin immediate construction of a new plant at Fort Smith, Ark. The new plant, scheduled for completion around February 1, 1961, will combine the newest engineering and manufacturing concepts in the mechanical rubber goods industry. It will initially manufacture automobile floor mats; molded precision rubber parts for automotive, oil field and general industry; and semi-pneumatic tires for industrial, agricultural implement and other applications. The unit will be 190,000 square feet in area and will cost approximately $3,000,000. Initially employing about 250 people, its design will permit future expansion.

Building Bowling Ball Plant

► American Hard Rubber Co., a division of Amerace Corp., New York, N. Y., announced it is building a highly automated plant for the manufacture of bowling balls in Booneville, Ky. The new plant represents an initial investment of more than $2 million and when production begins, by late Summer or Fall of 1960, AHR's bowling ball production capacity will be more than doubled, the company states. The new facility is being erected adjacent to the plant which the company built in 1955 to manufacture Ace hard rubber combs.

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Financial News

Goodrich Reports Increase in 1959 Sales and Earnings

► B. F. Goodrich Co., Akron, Ohio, reports a 6 per cent increase in earnings and a 10.7 per cent increase in sales for 1959. Net income for the 1959 fiscal year, after provision for all costs, including taxes and depreciation, amounted to $37,580,186, equal to earnings of $4.18 per share of common stock, compared with $35,457,421, or $3.95 per share in 1958. Net sales in 1959 totaled $771,591,342, compared with the 1958 figure of $697,296,556. According to the company, net sales and net income were adversely affected by a 55-day strike in eight of the firm's tire and industrial rubber products plants in the second quarter, and by the effects of the steel strike on automotive and other important customers in the third and fourth quarters.

Capital expenditures and investments during 1959 for the modernization and expansion of manufacturing, distribution and research facilities amounted to $34,275,000, compared with $27,616,000 in 1958. Net working capital was $251,697,612 at year end, compared with $252,373,356 at the end of 1958. Federal and foreign income taxes for 1959 totaled $36,353,000, compared with $35,183,000, the previous year.

American Enka

► For 1959: Net income amounted to $5,723,278, equal to earnings of $4.31 per share of common stock, compared with $1,364,853, or $1.02 per share for the 1959 fiscal year. The 1959 net income figure includes a special credit of $623,000. Sales in 1959 totaled $109,175,718, compared with the 1958 figure of $73,533,145.

Raybestos-Manhattan

► For 1959: Net income after taxes amounted to $3,904,723, equal to earning of $6.19 per share of common stock, compared with $1,902,018, or $3.01 per share last year. Net sales in 1959 totaled $88,710,186, compared with $72,260,257 the previous year.

Lamb Industries

► For 1959: Consolidated net income amounted to $862,937, with $204,318 set aside for amortization and depreciation and $65,442 used for settlement of litigation and other special items, leaving net earnings of $593,177, or 54c per share of common stock.

Columbian Carbon

► For 1959: Net earning amounted to $6,908,000, or $4.28 per share of common stock, compared with $3,966,000, or $2.22 per share for the 1958 fiscal year. Net sales and other income for 1959 totaled $76,146,000, compared with $65,957,000 in the previous fiscal year. A special credit of 24c a share in the first half of 1958 was derived from the sale of properties. A special charge of 51c a share in 1959 resulted from the negotiated settlement of claims made by purchasers of natural gas during prior years.

United Carbon

► For 1959: Net income amounted to $6,635,000, or $5.21 per share of common stock, compared with $5,583,000, or $4.54 per share the previous year. An additional non-recurring profit of $1,459,000, or $1.15 per share, brought the 1959 net income to $8,095,000, or $6.36 per share. Net sales in 1959 totaled $62,171,000, compared with the 1958 figure of $56,483,000.

Garlock Packing

► For 1959: Net income was $1,720,619, or $3.49 per share of common stock, compared with $701,453, equal to $1.42 per share, for the previous year. Net sales amounted to $33,470,570, compared with $26,446,230 in 1958.

Triangle Conduit & Cable

► For 1959: Net income amounted to $2,305,676, equal to $1.70 per share of common stock, compared with $2,556,695, or $1.88 per share for the previous year. Net sales totaled $58,177,192, compared with the 1958 figure of $56,901,106.

U.S. Rubber Reclaiming

► For 1959: Earnings after taxes amounted to $557,204, or $1.25 per share of common stock, compared with $301,210, or 67c per share the previous year. Sales in 1959 totaled $7,057,227, compared with the 1958 figure of $5,224,793.

Seiberling Rubber

► For 1959: Net income amounted to $1,191,019, or $1.72 per share of stock, compared with the 1958 figure of $1,070,089, or $1.50 per share. Net sales in 1959 totaled $54,787,924, compared with $48,134,084 in 1958.

Goodyear Sales and Earnings Highest in its History

► Goodyear Tire & Rubber Co., Akron, Ohio, achieved the highest sales and earnings in its history in 1959. For the fifth consecutive year, net income established a new high, increasing 15.6 per cent to $76,008,956, equal to common stock earnings of $2.29 per share, compared with the 1958 figure of $65,741,382, or $1.98 per share. Consolidated net sales in 1959 topped the billion-and-a-half mark for the first time, increasing 15.5 per cent to $1,579,257,984, compared with $1,367,575,535 in 1958.

E. J. Thomas, chairman of the board of Goodyear, states that the company's record volume of sales and profits was accomplished despite the adverse effect of the steel strike in the final quarter which resulted in reduced deliveries of the firm's products to some customers. He predicted that Goodyear's markets for 1960 would be substantially larger than in 1959, with improvements in both the tire replacement and original equipment business.

Goodyear foreign operations in 1959 contributed $23,116,932 to consolidated net income, an increase of almost 25 per cent over the year before. Capital expenditures for all purposes in 1959 increased to $55,640,633, compared with $53,347,979 spent in 1958. In 1959, Goodyear increased its working capital to $510,392,427, compared with $477,100,074 at the end of 1958. United States and foreign income taxes amounted to $64,675,000, against $66,493,000 in 1958.

American Biltrite Rubber

► For 1959: Net income amounted to $3,016,925, equal to common share earnings of $2.13, compared with 02,304,161, or $1.74 per share last year. Net sales totaled $70,393,714, compared with $59,617,994 for the 1958 fiscal year. Results for the 1959 fiscal year do not include the firm's share in undistributed earnings of American Synthetic Rubber Corp., which amounted to $264,941, or 18c a share in 1959.

O'Sullivan Rubber

► For 1959: Net earnings after taxes amounted to $295,560, equal to common share earnings of 67c, compared with $125,092, or 23c per share for the previous year. Net sales in 1959 totaled $8,678,359, compared with the 1958 figure of $6,226,326.

Ansonia Wire & Cable

► Year ended October 31: Net loss of $291,369, compared with a net loss of $421,642 after a tax credit of $268,208 in the 1958 fiscal year.

The Case of The
MYSTIC MONKEY
DON'T LOOK SO GLUM, JOHN!
I CAN'T HELP IT! SOME CONTAMINATED SOLVENTS SLOWED DOWN PRODUCTION AGAIN AND IF IT HAPPENS ONCE MORE...I'VE HAD IT!
HEY! LET GO!
DARN IT! SAY! WHAT'S THIS ABOUT SKELLYSOLVE IN THIS MAGAZINE AD?
TO KEEP OUT ALL CONTAMINANTS, SKELLYSOLVE PUMPS, LOADING LINES, STORAGE TANKS AND TANK CARS ARE...
FINE! WE'LL LOOK FOR DELIVERY RIGHT AWAY!
USED ONLY FOR SKELLYSOLVE! AND TANK CAR SHIPMENTS ARE MADE ONLY FROM THE REFINERY
PURCHASING AGENT
MINUTES LATER
CONGRATULATIONS, JOHN! PRODUCTION IS CLIMBING SINCE YOU SWITCHED TO SKELLYSOLVE... AND SO IS YOUR SALARY!
THANKS, BOSS!
SOME MONTHS LATER
THAT'S A BIG TIP FOR A MONKEY, JOHN!
IT'S NOTHING COMPARED TO THE TIP HE GAVE ME ON SKELLYSOLVE!

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Skellysolve for Rubber and Related Industries

SKELLYSOLVE-B. For making quick-setting cements for the shoe, tape, container, tire and other industries. Quick-drying, with no foreign taste or odor, in dried compound. Closed cup flash point about -25° F.

SKELLYSOLVE-C. For making quick-setting cements with a somewhat slower drying rate than those compounded with Skellysolve-B. Closed cup flash point about 13° F.

SKELLYSOLVE-H. For general use in manufacturing operations and cements, where faster evaporation rate than that of Skellysolve-C is desired. Closed cup flash point about -16° F.

SKELLYSOLVE-L. For general manufacturing operations where a medium evaporation rate is required. Closed cup flash point about 12° F.

SKELLYSOLVE-R. For general use in tire building and a variety of other manufacturing operations and cements. Reduces evaporation losses. Medium quick final dry. Lessens bloating and skinning tendency. Closed cup flash point about -25° F.

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SKELLY Skellysolve

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West Coast News

► Past-chairmen were honored at the March 1 meeting of the Los Angeles Rubber Group, Inc., which was held at the Biltmore Hotel. Principal speaker was Philip Geary, famed world traveler, who flies 140,000 air-miles each year to speak before civic, social and educational groups in this country and abroad. Mr. Geary's talk was entitled "Family of Man." A feature of the dinner meeting was the initiation of three members into the Grand Lodge of Tlargi Past Chairmen (GLTPC), Roy Phelen, Al Federico and Charles Kuhn.

At the technical meeting, which preceded the dinner meeting, R. D. Sullivan (Shell Chemical) discussed "Shell Isoprene Rubber." According to Mr. Sullivan Shell isoprene rubber, produced by Shell Chemical on a commercial scale since last spring, is handled, in general, like natural rubber and offers the same advantages of high resilience and low heat build up. However, he said, some variations from the techniques and formulations used with natural rubber are required to achieve optimum properties. Mr. Sullivan discussed procedures for compounding; the effects of various carbon blacks; and accelerator levels required to obtain the best over-all balance of properties.

Prize winners at Tlargi's February 2 monthly meeting included: Door Prize —Manny Bleek (Western Insulated Wire) carving board; Raffle—Bill Keville (Glidden), electric ice crusher; John Augenstein (Kirkhill Rubber), hand mixer; M.A. McDonald (Midwest Rubber Reclaiming), TV trays; Elden Sallee (Goodyear), carving set; Will Wimond (Pacific Moulded), transistor radio; John McGrath (Byron Jackson), can opener and knife sharpener; and Bill Ireland (Firestone), home and car electric shaver.

► St. Joseph Lead Co., New York, N.Y., has announced the appointment of Harwick Standard Chemical Co. of California as its sales representative in the state of California. Harwick Standard will handle St. Joseph's line of zinc oxides and will maintain warehouse stocks in Los Angeles and San Francisco to serve less-than-carload customers. Carload shipments will continue to be made directly from the St. Joseph plant in Josephtown, Penna. Harwick Standard has been the St. Joseph zinc oxide sales representative in Southern California for many years, and under the new arrangement it will service the entire state.

► Glen Goes, formerly associated with the Kirkhill Rubber Co., has joined the Stillman Rubber Co.

► Plastic and Rubber Products Co., Los Angeles, Calif., has announced the formation of a new Fluorocarbon Division. The new division, located in Gardena, Calif., will fabricate standard O-rings, V-ring packings, Teflon scrapper rings, grommets, static face seals as well as back-up and spiral back-up rings, the company states. In addition, the new division will be processing Teflon sheet, rod, tube and tape. Other materials to be processed include Kel-F, nylon and polyethylene.

The company claims that the new plant will be the first of its kind in the West to incorporate complete temperature and dust control measures. The temperature in all areas, including fabrication, burring, loading, shipping and inspection, will remain a constant 72°F. with a 50 per cent humidity factor. Dust control will be accomplished in the processing and molding areas through pressurization, with the pressure inside being two pounds greater than outside. The new division will be staffed with an Engineering Department to handle special engineering problems including design, prototype, development and special part fabrication, the company states.

► Robert W. McCullough has been appointed western district manager for the Rubber Chemicals Department of American Cyanamid Co. He will make his headquarters at the company's general office at 2300 South Eastern Ave., Los Angeles, Calif. Mr. McCullough joined American Cyanamid in 1950 and has served in various technical and sales capacities with its Rubber Chemicals Department since 1953. Prior to 1950, he was associated with the Firestone Tire and Rubber Co. in Ohio and South Africa. A member of the Rubber Division of the American Chemical Society, he also belongs to the Akron, Philadelphia, New York and Southern Rubber Groups.

► B. F. Goodrich Chemical Co. has appointed Philip H. Lawrence, manager of the company's chemical plant at Niagara Falls, N. Y., as plant manager for its vinyl resin and compound plant now under construction in the Watson area of Los Angeles County near Long Beach, Calif. Other key personnel appointed to management positions at the new plant include A. R. Webber and W. R. Holstein. Mr. Webber will be responsible for production and technical operations while Mr. Holstein will be responsible for accounting, purchasing and personnel. Both are from company offices in Cleveland.

General Tire Names Three

► General Tire & Rubber Co., Akron, Ohio, has promoted James W. Dannemiller to the position of production manager of its Akron tire plant. Simultaneously, the company named James P. Plant general foreman of the Processing Division and M. T. Helmacy general foreman of the Single-Bead Tire Building and Auxiliary Departments. Formerly general foreman of processing, Mr. Dannemiller succeeds Robert Rehm, who was recently named plant manager of General Tire's Mayfield, Ky., tire plant which is now under construction. He has been associated with General Tire since 1952, when he joined the company's training program.

Mr. Dannemiller has held the positions of manager of quality control, manager of employee training and, most recently, general foreman of the Processing Division. Mr. Plant joined General Tire in 1954, following his graduation from Kent State University. Also a graduate of General Tire's training program, he has been floor foreman of passenger tires and general foreman, first of final finish and then of passenger tires. Mr. Helmacy has been with General Tire for 38 years and has had extensive experience in every phase of tire production supervision.

► Robert G. Moore (Harwick Standard Chemical) recently became a member of the Los Angeles Rubber Group.

► Bob Youmans, formerly of Los Angeles Standard Rubber, is now chief chemist at Lamb Rubber.

► Milt Stotz has been transferred from W. J. Voit's 25th Street laboratory to the new Costa Mesa laboratory.

► O. E. Dutton has been appointed factory manager for the Xylos Rubber Co.

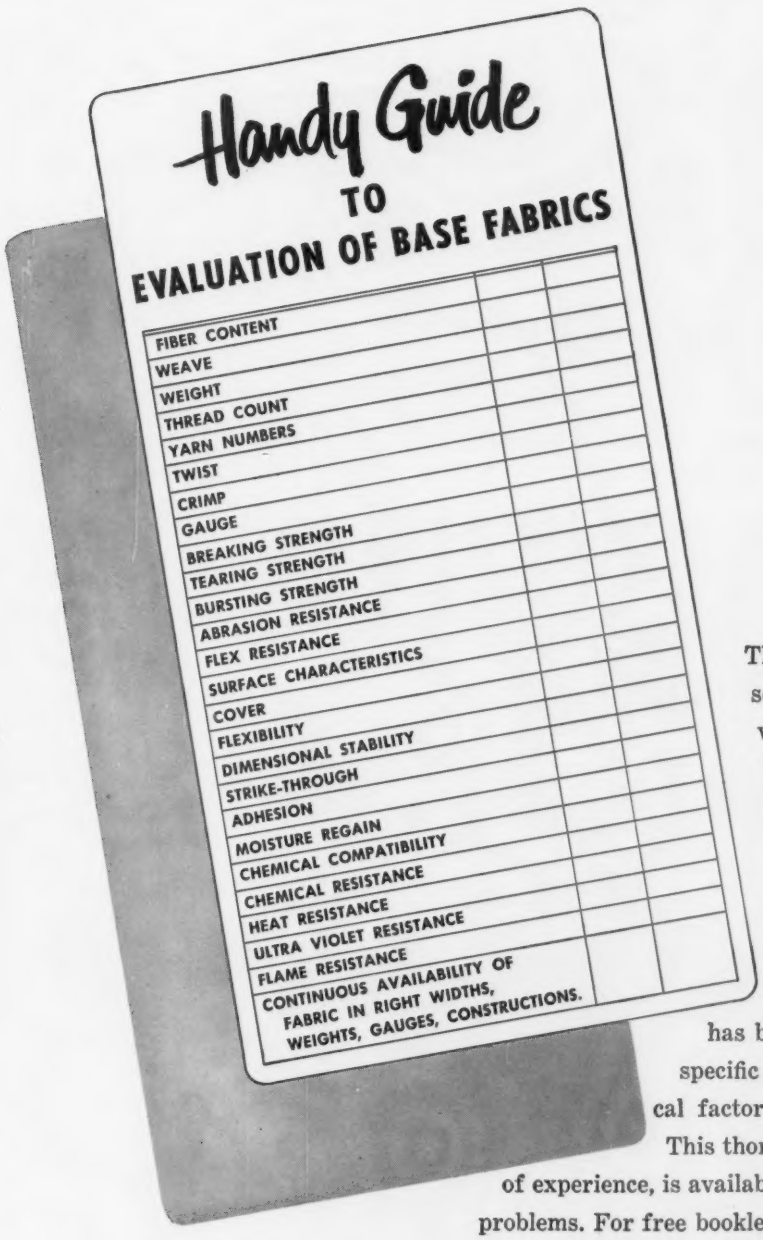
► Charles T. Connor has been named division manager for the Firestone Tire & Rubber Co. plant in California.

► Ervin Stuenkel, who previously served at the Kirkhill laboratory, is now with extruded products at the Fullerton Manufacturing Co.

► Leighton Taylor, of the Mask-Off Co., has been appointed president of the Monrovia Chamber of Commerce.

► Robert A. Youmans has been appointed chief chemist at the Lamb Rubber Corp.

► Charles H. Churchill has joined California Rubber Products, Inc., as sales manager.



This fictitious "guide" has been created solely to show some of the factors which often have to be considered in the selection of a base fabric. They serve only to point up one fact: that there can be *no* such thing as a put-it-in-your-pocket guide in this field. But one thing is certain: when you're guided by Wellington Sears, you know that your base fabric has been considered in the light of your specific need, and that all significant technical factors have been thoroughly examined. This thoroughness, plus more than a century of experience, is available to help solve *your* working-fabric problems. For free booklet, "Fabrics Plus," write Dept. G4.

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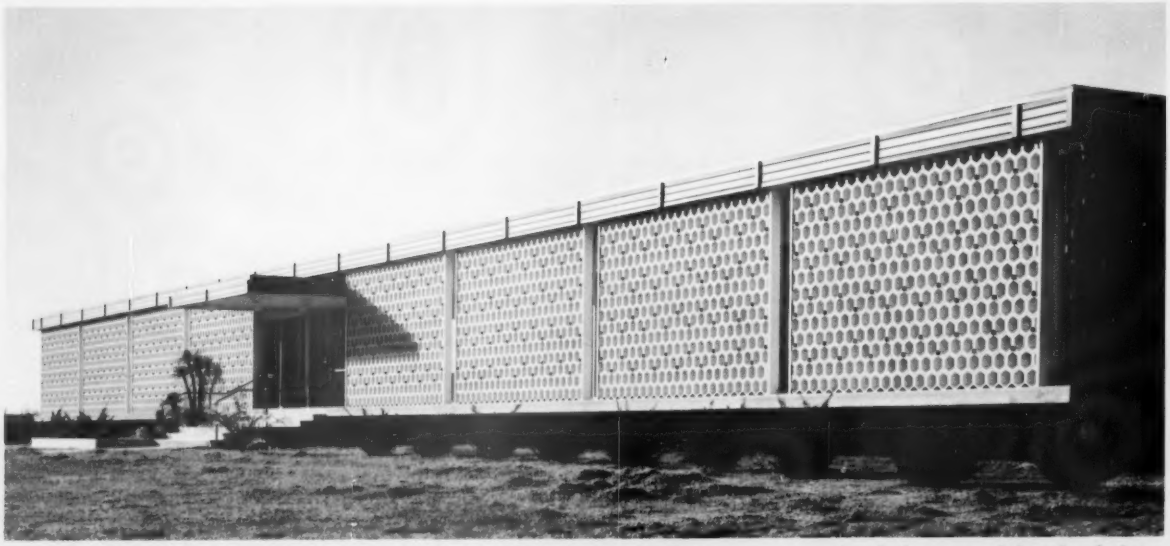

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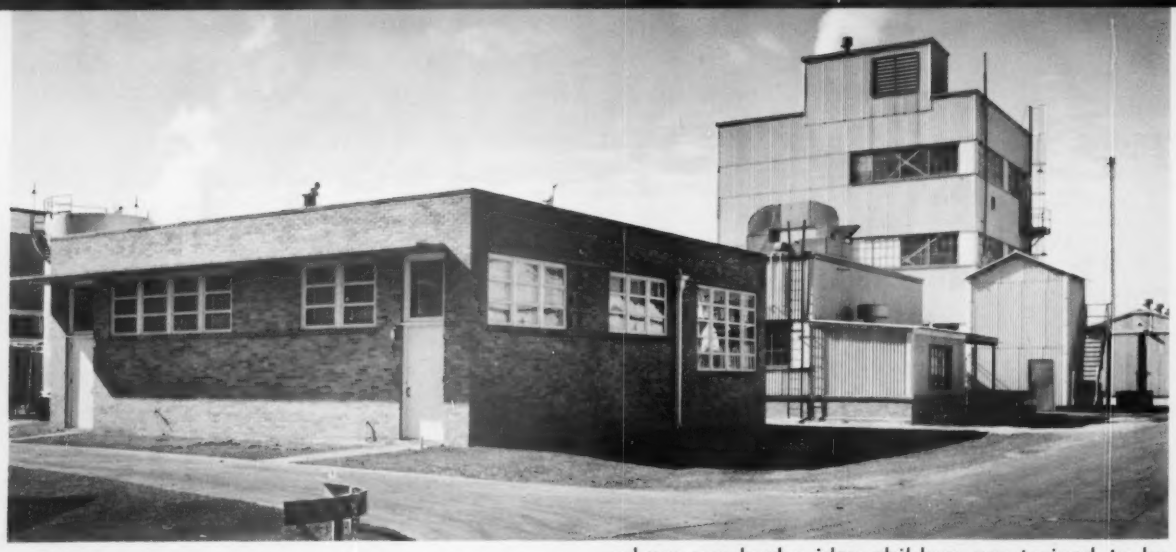

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Five Rubber Firms Using Seaway

► Five rubber companies are planning to import 3,300 tons of natural rubber from the Far East this Spring via the St. Lawrence Seaway. Industry officials report that the shipment will be the first such to be routed over the Great Lakes and pointed out this routing is experimental. The rubber companies taking part in the routing experiment are Firestone Tire & Rubber Co., General Tire & Rubber Co., B. F. Goodrich Co., Goodyear Tire & Rubber Co., and U. S. Rubber Co. According to industry spokesmen, if it is found that Cleveland or other lake ports cannot handle the shipment expeditiously, there will be no further shipments via the experimental routing.

Carrying the natural rubber shipment will be the *Pindar* of the Orient Mid-East Lines. The *Pindar* is scheduled to leave Singapore in mid-March and is due to make its first stop on the Lakes at Toronto, Ontario, on May 1. Rubber also will be unloaded at Hamilton, Ontario, Cleveland, Detroit and Chicago. A total of 1,300 tons is consigned for the port of Cleveland, a majority of which will be trucked to Akron. Regular natural rubber shipments for mid-western plants are landed at Atlantic coast ports and shipped inland by train or truck.

Firestone Synthetic Promotions

► Firestone Synthetic Fibers Co., Pottstown, Penna., has made two appointments at its Hopewell, Va., plant, including Kenneth L. Edgar as vice-president and Stuart G. Keiller as sales manager. Mr. Edgar will also continue his present duties as vice-president of the Firestone Plastics Co. in Pottstown. Mr. Edgar joined Firestone in 1940 and held various positions in the Firestone Industrial Products Co., Akron, Ohio. He was transferred to Firestone Plastics at its inception in 1947 and assumed the position of sales manager for the Sheeting Division in 1949. In 1952, he was named vice-president of Firestone Plastics. Mr. Keiller has been associated with Firestone since 1945, when he joined the organization in Paterson, N. J. With the inception of Firestone Plastics in 1947, he was transferred to its Sales Division. Mr. Keiller was named sales manager for Velon yarn sales in 1951.

Stalwart Rubber Elects Three

► Stalwart Rubber Co., Bedford, Ohio, has elected three of its executives to its board of directors. The new board members include Richard R. Long, factory manager, Silicone Department; Albert V. Volpe, factory manager, Extrusion and Lathe Departments; and John J. Kravetz, technical research director.

The Kongresshalle in West Berlin at which the 1960 Rubber Conference will be held.

German Rubber Conference Planned

► The 1960 Rubber Conference of the Deutsche Kautschuk-Gesellschaft will be held from October 4 to 7 at the Kongresshalle, West Berlin, Germany. To be conducted on an international basis, the conference will include lectures dealing with topical problems relating to the chemistry, physics and technology of natural and synthetic rubber; work in the field of tires and testing technology; and development of textiles for the rubber industry.

Concurrently, there will be an exhibition showing processing and testing machinery for the rubber and plastics industries. The exhibits will consist mainly of new developments, and for the first time in the history of the conferences, it will include a survey of the state of international developments reached by man-made fibers. Long lecture intervals will enable the conference participants to inspect the exhibition in detail.

New Rubber Cleaner Introduced

► Schwartz Chemical Co., Inc., Long Island City, N. Y., has introduced what is said to be an effective rubber cleaner and restorer that is easily applied to the surfaces of rubber parts in typewriters, office machines and printing equipment. The product is a non-volatile, non-inflammable liquid that renews the surface properties of platens, rollers and other friction rubber parts through its surface plasticizer action on natural rubber. Called Rub-R-Vive, the liquid is easily applied with a cloth. According to the company, Rub-R-Vive provides true plasticizer action that assures softening of rubber surfaces without drying effect.

Cabot Adding to Production

► Godfrey L. Cabot, Inc., Boston, Mass., reports that it will add 110 million pounds per year to its present production of oil furnace blacks for domestic consumption. Cabot reports that the production increase will be brought about through a modification and expansion program now being completed at four of its southwestern carbon black plants.

Develops Rigid Polyurethane

► General Latex & Chemical Corp., Cambridge, Mass., has announced the development of a new rigid polyurethane foam called Vultafoam. According to the company, the new material has shown good performance characteristics as a pour-in-place flotation filler for boats. Vultafoam is a two-part system which is easy to mix and pour and rises quickly, forming a strong bond with wood, metal or plastic, the company states. Vultafoam is a polyether freon-blown rigid type foam from 1½ 25 pound density with 90-95 per cent closed cells. Because it is not affected by water, oils, acids, alkalis or marine life and does not break up under shock, Vultafoam is particularly well suited for docks and floats, the company claims.

Gates to Build Hose-Making Plant

► Gates Rubber Co., Denver, Colo., plans to construct a $4 million hose-making plant at Galesburg, Ill. Due to start operations in January, 1961, the plant will supplement hose-making operations in Denver.

Canadian News

► Polymer Corp. Ltd., Sarnia, Ontario, has made three personnel changes in its purchasing and traffic organization. J. F. Sayre has been appointed to the newly created position of manager of purchasing and transportation; H. H. Manktelow has been named manager of the Traffic Department; and J. V. Lawlor becomes purchasing agent. Mr. Sayre is a graduate of McGill University with a degree in chemical engineering. He joined Polymer in 1942 as a plant engineer, and in 1951 became assistant manager of the Purchasing and Stores Department. In 1958 he was named manager of the department. Mr. Sayre is a member of the Canadian Association of Purchasing Agents, the National Association of Purchasing Agents and the Sarnia and District Traffic Club.

Mr. Manktelow, a graduate of the College of Advanced Traffic, joined Polymer in 1947 as assistant traffic manager, after serving 22 years with Canadian National Railways. In 1957, he was named traffic manager. Mr. Lawlor, prior to joining Polymer in 1944 as a buyer in the Purchasing Department, was associated with Carter-Halls-Aldinger Ltd. and Atlantic Sugar Refineries. In 1951, he was appointed supervisor of buyers and in 1958 was named assistant purchasing agent.

► Canadian Industries, Ltd., Montreal, Quebec, has announced that its Paints Division has developed an acrylic-latex exterior paint after five years of laboratory and field research followed by market testing. According to CIL, the two main advantages of the new product are that it cuts brushing time by 50 per cent and is more blisterproof than any other type of paint. The acrylic-latex paint dries in less than an hour and will not be affected by rain if the paint is allowed to dry for as short a period as 20 minutes, the company states.

► The first tire to be manufactured in Western Canada has been assembled and cured at the new Calgary, Alberta, plant of Firestone Tire & Rubber Co. of Canada, Ltd. The tire, a 750-14 Deluxe Champion tubeless tire, was produced to test the installation of the first tire building and curing machines of the most advanced type in North America, the company reports. When completed in August, the new plant will manufacture a full line of passenger, truck, bus, farm and implement tires for Western Canada.

► Columbian Carbon Co., New York, N. Y., reports that it will construct a plant for the manufacture of carbon black in Canada to meet the growing requirements of Canadian consumers. To be located in the Toronto area, the facility is expected to begin operations in 1961 with an initial annual capacity of approximately 40 million pounds of oil furnace blacks. The plant will be operated by Columbian Carbon (Canada) Ltd.

► The Canadian government has turned down an offer of $75 million for its Crown-owned Polymer Corp., Ltd., in Sarnia, Ontario. The purchase offer was made by Ventures Ltd., Toronto, Ontario, a mining and industrial complex headed by J. D. Barrington, a former president of Polymer Corp. The synthetic rubber plant cost $48 million to build and commenced production in 1944. During the past three years, Polymer Corp. paid government dividends of $10 million on federal holdings of $30 million in capital stock.

► R. M. Ferguson & Co., Toronto, Ontario, has incorporated under the name of R. M. Ferguson & Co., Ltd. The company is now located at 4195 Dundas St., West, Toronto, Ontario.

Producing 13-Inch Dual 90 Tire

► Twin-treaded tires said to have unusual strength and durability are being produced by the General Tire & Rubber Co., Akron, Ohio, for use on the new compact cars. The company is now producing its top quality Dual 90 automobile tire in the 13-inch rim sizes required for the smaller cars introduced by Detroit. The 13-inch Dual 90 has been engineered to provide maximum stability and, at the same time, keep the amount of unsprung weight to a minimum.

In the design of the original Dual 90, General Tire engineers departed from conventional tire design, employing a dual curvature construction principle which provides parallel treads and two main points of contact with the road. The company is constructing the Dual 90 with Nygen fabric in the tire body and Gentro-Jet SAF rubber, a blend of rubber and ultra-fine carbon black. The 13-inch Dual 90 will be available in both 6.00 to 6.50 cross-sections. The Silent Safety Winter Cleat Nygen will also be produced for cars with the smaller wheel diameter.

C. A. Larson

Appointed Branch Manager

► Carl A. Larson has been appointed branch manager of the newly opened New Haven, Conn., office of Wyrough and Loser, Trenton, N. J. Mr. Larson is a graduate of Dickinson College and since 1939 had been with Whitney Blake Co., as development engineer and rubber chemist. He is a member and past president of the Connecticut Rubber Group, a member of the American Chemical Society and past national director of the Rubber Division of ACS.

The recently-opened New Haven office will serve Connecticut and eastern New York and will handle sales and technical service on Wyrough and Loser's Poly-Dispersions as well as products of B. F. Goodrich Co., Naugatuck Chemical Division, Georgia Marble Co., Haven Chemical Corp., Lukon Inc., Metalsalts Corp., Pelmor Laboratories, Pitt-Consol Chemical Co. and Beech-Nut Life Savers, the company states.

Boston Chemical Dry Stearate

► Boston Chemical Products Co., Boston, Mass., has announced the development of a dry form of ammonium stearate. According to the company, it is the form rather than the chemical composition which makes this new product a unique material. In this dry form, the company states, ammonium stearate offers many new possibilities: it has a higher melting point than most metallic stearates; it can be dispersed in hot water without the need of a surface active material; it is metal free and upon the application of heat above 190°F. it decomposes to ammonia gas and stearic acid, which is completely water insoluble. The company reports that the new dry form is being made available to the industry in 50 pound multi-walled paper bags. Ammonium stearate, in this finely divided form offers savings in packaging, shipping and handling, and also releases valuable storage space for other products, the company states.

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PRODUCTION FACILITIES INCREASED TO MEET CONSTANTLY GROWING DEMAND

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Obituaries

Otto Haas

► Otto Haas, founder of Rohm & Haas Co., died on January 2 at his home in Villanova, Penna., two days after his retirement. He was 87 years old. A native of Stuttgart, Germany, Mr. Haas came to the United States in 1902 and was associated with an export firm dealing in hides. In 1909, Mr. Haas, with his business associate Dr. Otto Rohm, founded Rohm & Haas Co., and was its chief executive officer for 50 years. On December 31, 1959, Mr. Haas retired from the company, giving up his positions of chairman of the board of directors, president, and chairman of the executive committee. He remained a member of the board of directors and was named honorary chairman. He is survived by his wife and two sons.

William P. Witherow, Sr.

► William P. Witherow, former president of Blaw-Knox Co., died on January 7 at his office in Pittsburgh, Penna. He was 71 years old. Mr. Witherow, at his death, was president of the Cement Stone Corp. and was on the boards of directors of the Pittsburgh Chamber of Commerce, the Pittsburgh and West Virginia Railway Co., the Westinghouse Air Brake Co., the Pittsburgh Consolidation Coal Co., and the Monongahela Light and Power Co. In 1943, as president of Blaw-Knox, Mr. Witherow supervised preparation of the plant designs for a major part of the nation's synthetic rubber program. For this work, he was presented with the Award for Chemical Engineering Achievement in 1943.

W. Wallace Roff

► W. Wallace Roff, vice-president and director of Whittaker, Clark & Daniels, Inc., New York, N. Y., died on January 16. He was 57 years old. Mr. Roff's association with Whittaker, Clark & Daniels commenced as an office boy and covered a period of 42 years. During that time he served the company as a sales representative, sales manager and vice-president. He is survived by his wife and three sons.

Charles M. Davidson

► Charles M. Davidson, sales manager of Hodgman Rubber Co., Framingham, Mass., died on February 15 at his home in Dover, Mass. He was 59 years old. Associated for over 30 years with Hodgman Rubber, Mr. Davidson was widely known in the rubber, textile and leather trade. He is survived by his wife and a daughter.

James F. Sweatt

► James F. Sweatt, retired manager of the Los Angeles plant of B. F. Goodrich Co., died on January 10 at his home in Long Beach, Calif. He was 69 years old. Mr. Sweatt was born in Lewisburg, Ky., and attended the University of Kentucky. He joined Goodrich in 1923 as a factory employee in Akron, Ohio. In 1928, when Goodrich opened its Los Angeles plant, he was named plant supervisor. In 1943, he was appointed manager of the firm's Oaks, Penna., tire plant. Mr. Sweatt returned to Los Angeles in 1951 as plant manager, and retired from the company in 1956.

William C. Dunlap

► William C. Dunlap, manager of purchasing of New Jersey Zinc Co., New York, N. Y., died on February 18 at his home in New York City. He was 66 years old. Mr. Dunlap was born in Harrisburg, Penna., and after graduating from Princeton University joined New Jersey Zinc in 1915 as a civil engineer in the Purchasing Department. He was appointed purchasing agent in 1945 and manager of purchasing in 1955. He was a member of the Purchasing Agents Association. Mr. Dunlap is survived by his wife, two sons and two daughters.

Paul W. Gamble

► Paul W. Gamble, factory manager of Xylos Rubber Co., Akron, Ohio, died of a heart attack on March 3 at his home in Akron. He was 61 years old. Mr. Gamble was born in Wheeling, West Va., and graduated from Hammel Business College in Akron. He began his business career in 1915 and worked for several rubber firms before joining Firestone in 1926 as a foreman at the Xylos company. He was appointed production superintendent at the Xylos plant in 1929 and was named factory manager in 1937. He is survived by his wife and a daughter.

C. Blake Galbraith

► C. Blake Galbraith, vice-president and director of Cambridge Rubber Co., Cambridge, Mass., died on January 31 in Baltimore, Md., after a long illness. He was 62 years old. In addition to his position with Cambridge Rubber, he was president and director of its subsidiary, Carroll Shoe Co., Littlestown, Penna., and president of the Cambridge Rubber Foundation. Prior to joining Cambridge Rubber in 1944, he was associated with Firestone Tire & Rubber Co. and Ohio Rubber Co.

Awarded Research Contracts

► Institute of Rubber Research of the University of Akron has been awarded four research contracts totaling $108,800. Two contracts are with the Wright Air Development Division of the U. S. Air Force. The first, which totals $40,000, is for research in physical chemistry of organic and inorganic polymers and extends to April, 1961. The other, for research on the molecular effects of certain high polymers, totals $60,000 and runs to February, 1963. Union Carbide Chemicals Co. has awarded a $3,800 grant-in-aid to the University for research in polymer chemistry.

A $5,000 contract with the U. S. Rubber Co. has been renewed through next September for research in anionic polymerization. There were also four membership renewals in the Akron University Associates program for 1960, including the General Tire Foundation, Seiberling Rubber Co., Monsanto Chemical and Ohio Edison Co. Robinson Clay Products added $1,000 to its fund, for an annual cash award to an outstanding senior student in the College of Engineering. The fund, in effect since 1952, totals $15,000. Unrestricted gifts from Roadway Express, of $1,000, and Adamson-United, Inc., of $1,000, were made to "further the interests of rubber chemistry."

Increases Carbon Black Capacity

► J. M. Huber Corp. plans to increase carbon black capacity at its plant near Baytown, Texas, from about 60 million pounds to 100 million pounds annually. The company now has 12 reactors at Baytown and plans to add 13 smaller reactors. Construction is scheduled to be completed by year's end.

Carl C. Shipman

► Carl C. Shipman, former staff superintendent for B. F. Goodrich Co., Akron, Ohio and factory manager of the Goodrich plant at Kitchener, Ontario, Canada, died on January 4 at his home in Akron, Ohio. He was 67 years old. Mr. Shipman was educated at Toledo University, and joined Goodrich in 1925, retiring in 1951. He then joined Goodyear Aircraft Corp., and remained with that firm until his retirement in 1957. Mr. Shipman is survived by his wife, two sons and a daughter.

Clarence A. Giesler

► Clarence A. Giesler, president of Jasper Rubber Products, Inc., Jasper, Ind., died on February 14 in Jasper Memorial Hospital. He was 59 years old. A native of Jasper, Mr. Giesler was one of the founders of the rubber company and served as president since 1950. He is survived by his wife and a son.

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Overseas

Copenhagen—A polyethylene plant and units to produce raw materials for synthetic rubber will be constructed at the Maersk refinery near Copenhagen, Denmark. The facility is expected to produce 10,000 tons of polyethylene annually.

Tokyo—Three Japanese producers have been licensed to use the Sohio Chemical Co. acrylonitrile process, pending government approval. Mitsubishi Chemical will build a 20-ton-per day plant, while Asahi Chemicals plans to construct a 15-ton-per-day unit. The third company has not been identified.

New Delhi—A tire factory will be constructed at Kalamasseri village near Ernakulam, India, by the Kerala government and Premier Tyres, a public concern. The project will receive technical assistance from an American tire producing firm. On completion, the unit is expected to produce 240,000 tires and tubes annually.

London—Britain's first acrylonitrile plant has been constructed by the General Chemicals Division of Imperial Chemicals Industries. Located at Cassel Works, Billingham, the unit is expected to supply Britain's needs for some time to come.

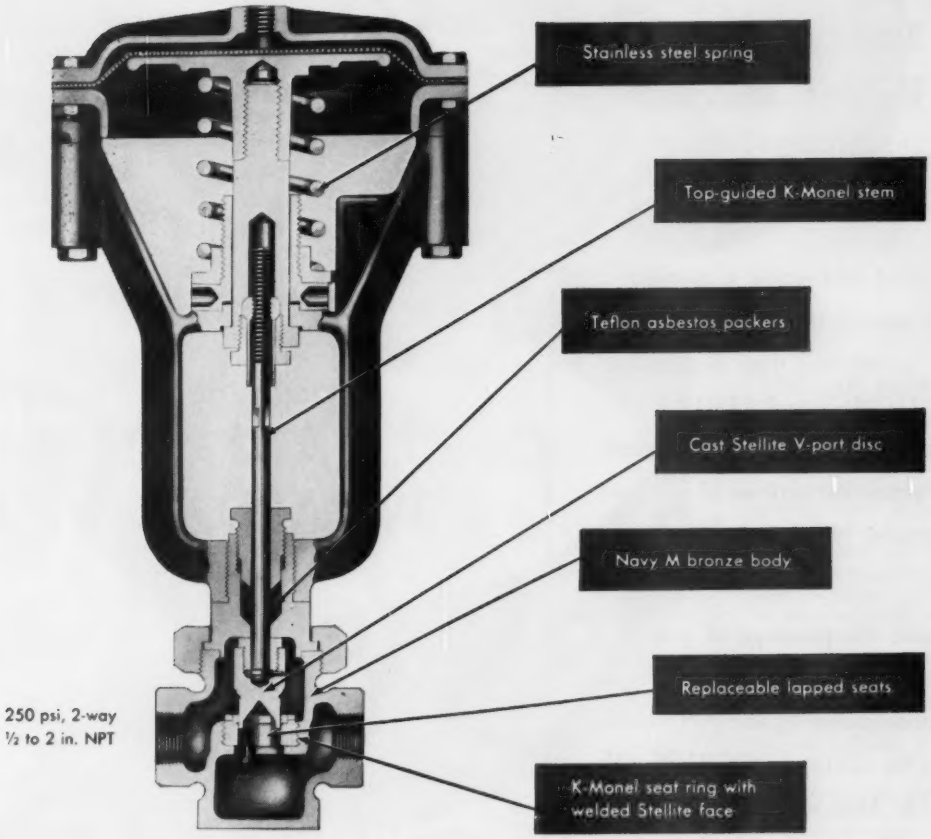
Paris—Societe Normande de Matieres Plastiques plans to begin industrial production of low pressure polyethylene at a plant in Linnebonne in northern France. Initial production rate at the unit is expected to be 7,000 tons per year.

Rome—A new company, Dow Chimica Italiana, S. p. A., has been formed by Dow International. The wholly-owned Dow subsidiary will construct a multimillion dollar manufacturing plant in Italy with its marketing office in Milan. A number of products are being considered for production, including the entire Styron line (Dow Polystyrene).

The Hague—Shell Chemische Fabrieken, N. V., will start production soon at its new synthetic rubber plant in Pernis, The Netherlands. The facility will comprise a unit for the production of butadiene, a styrene unit and a copolymerization unit. Annual capacity will be 50,000 tons of rubber.

Rome—S. p. A. Celene, a Sicilian firm located at Priolo, near Syracuse, plans to increase its polyethylene capacity to 60 million pounds annually, which will double its present output. The firm is jointly owned by Union Carbide and Societa Edison of Milan, Italy.

SINCLAIR-COLLINS® V-PORT VALVES



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Further details are easily obtained by writing to:

Secretary,

INSTITUTION OF THE RUBBER INDUSTRY
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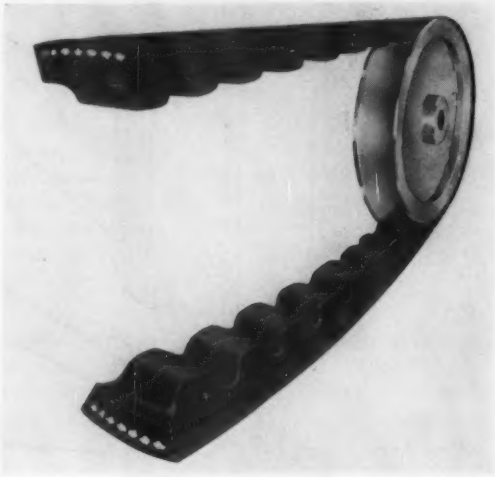
Telephone: Bayswater 9101

New Goods

Molded Notched V-Belt

►Raybestos-Manhattan, Inc., Passaic, N. J., has developed a fully molded, fully jacketed notched V-belt, called CX V-belt. The manufacturer claims the primary advantages for this new belt are quiet, vibrationless running characteristics, ruggedness and greater flexibility, permitting it to run smoothly over smaller pulleys. In addition,



the fully molded and fully jacketed construction is said to eliminate flex-cracking, and greatly increase fatigue resistance. The firm, fully fabric covered body also resists cross-sectional distortion, maintains lateral stability, and resists changes in effective length, the company states. According to Raybestos-Manhattan, in the placement of the cord in the belt, the high tensile strength members are micro-positioned and formed into an arch through a patented molding process. This results in increased sidewall pressure, providing more grip, little or no slippage, and more uniform pitch.

Naugatuck Tropiglas

► Naugatuck Chemical Division of the U.S. Rubber Co., Naugatuck, Conn., is marketing a plastic called "Tropiglas" for use as a roofing and window material. The plastic, an acrylic "syrup" reinforced with glass fibers, has been tested outdoors for more than a year, with results indicating that it will not discolor or warp in any weather, according to Naugatuck. It is made in sheet-sized, translucent panels in colorless form and also in 22 colors. Applications include sun deck and patio roofing, partitions, church windows and skylights, the company states.

Oil soluble, heat reactive...

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CATALIN RESIN 9273

A versatile, heat-reactive phenol dialcohol curing resin, supplied in lump form. It is highly compatible with Butyl and other synthetic rubbers and yields vulcanizates with *superior heat stability, high mechanical strength* and *low compression set values*. Vulcanizates cured with this resin resist reversion.

Catalin Resin 9273 can be readily milled with the rubber stock or in the compounding of adhesives, mixed with the solvent and premilled rubber. It is soluble in common solvents such as toluene and xylene.

Catalin Resin 9273 is produced with a carefully controlled methylol content, 9.0%-12.0%. Similar formulations with other methylol contents are available.

Catalin Resin 9273 is particularly useful in the production of steam hose, curing bags and bladders, belting for conveyors, tires, gaskets, grommets, cements.

Oil soluble, non-heat reactive

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This resin is also available in emulsified form and is designated Catalin Resin 9775

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Air-Inflated Fabric Building

►B. F. Goodrich Tire Co., Akron, Ohio, has developed a big, air-inflated, plastic coated fabric building which is being used as a low-cost storage warehouse for thousands of tires that have accumulated in inventory during the winter months. The tent-like structure, which is blown up like a balloon and supported by air pressure supplied by a two-horsepower electric blower, can accomodate up to 30,000 passenger car tires. Shaped like a quonset hut, the 226,195 cubic-foot air-building is 180 feet long, 60 feet wide and 30 feet high. A 20-foot long airlock, with 10-by 10-foot electrically operated doors at each end, permits vehicles and personnel to enter and leave without disturbing the pressure of slightly more than one pound per square foot that supports the 16,964 square feet of Geon-coated nylon fabric. Peg stakes hold the walls in contact with the ground to keep air from escaping. The translucent plastic material admits daylight, making artificial lighting unnecessary during the day. At night the interior can be lighted by placing floodlights outside the building. When the air-inflated building is no longer needed, it can be deflated and stored in a relatively small area.

Rubber-Steel Compressed Air Spring

► A spring for road and railway vehicles with a steel coil in a rubber container has been developed by Societa Pirelli-Saga, viale Abruzzi, 19, Milan, Italy. The company reports that the rubber container shares in the spring effort and at a given time, compressed air is delivered inside the container to enhance the spring effect. The unit consists of a steel spring in an airtight rubber container having its outer surface shaped spiral-wise. When the applied load is moderate, the internal chamber joins with the atmosphere and the rubber augments the steel spring's function by forcefully restraining vibration on each spiral caused by dynamic effect; reducing dynamic stress peaks, since under these conditions the rubber becomes more rigid; and protecting the steel from surface corrosion.

Surety Four-To-One Vinyl Gloves

► Surety Rubber Co., Carrollton, Ohio, reports the development of vinyl impregnated work gloves designed for longer wear. Called Four-To-One, the gloves outwear cotton and many types of leather gloves by four or more to one, the company claims. Styled for soft flexing hand comfort and positive gripping action, Four-To-One gloves are extremely abrasion and snag resistant as well as being easy to launder, the company states.

Candycote Floor Covering

► Crown Rubber Co., Fremont, Ohio, has developed a floor covering which can be used initially as carpeting and later as padding under conventional carpet. This floor covering, called Candycote, combines pinstripe or broadstripe fabric with a durable foam rubber backing made from Pliolite Latex 5352, recently introduced by Goodyear Tire & Rubber Co., Akron, Ohio. According to Crown, the new latex, used with Goodyear's Wing-Stay T antioxidant, produces a foam carpet backing with a long and useful life. The company reports that in addition to being an ideal floor covering, either as carpeting or under carpet padding, Candycote also is practical for use in carpet protectors, stair coverings or hall runners. Candycote is made with a foam rubber backing 3/16-inch in thickness. The cotton fabric patterns are available in 9x12-foot and 9-15-foot sizes with either serged or unserged edges. For use in halls or on stairs, or for wall-to-wall installations, Candycote is available in rolls of 27-inch or 9-foot widths.

Geon Vinyl Reinforced Rubber Hose

► Lawrence Hose Co., Trenton, N. J., has introduced a rubber hose reinforced with rigid Geon vinyl for use in industrial applications where dusts and gases create explosion hazards. According to the company, the hose is designed to replace wire reinforced hose which might cause sparking and explosions when the rubber exterior wears through and the wire is exposed. The new hose consists of a rubber core which is wrapped with a continuous coil of 3/16 inch round, rigid vinyl rod for added strength and rigidity. Both the core and coil are then wrapped with an exterior layer of abrasion resistant rubber. The rigid vinyl rod is made from Geon vinyl resin produced by B. F. Goodrich Chemical Co., Cleveland, Ohio.

Durable Hypalon Garden Hose

►Heirloom is a bright green garden hose that promises decades of service and will look good and work well despite heat and sunlight, chemicals and careless handling, claims the manufacturer, Swan Rubber Co., Bucyrus, Ohio. According to the company, the outstanding durability and weather resistance of the hose result from the use of DuPont's Hypalon synthetic rubber for the outer covering. The company reports that exposure to the hottest sunlight won't soften the hose and the quickest freeze won't cause it to become brittle. Tests by the manufacturer indicate that the hose may be expected to resist fading and discoloration for the duration of its wear life, estimated at 20 years or over.

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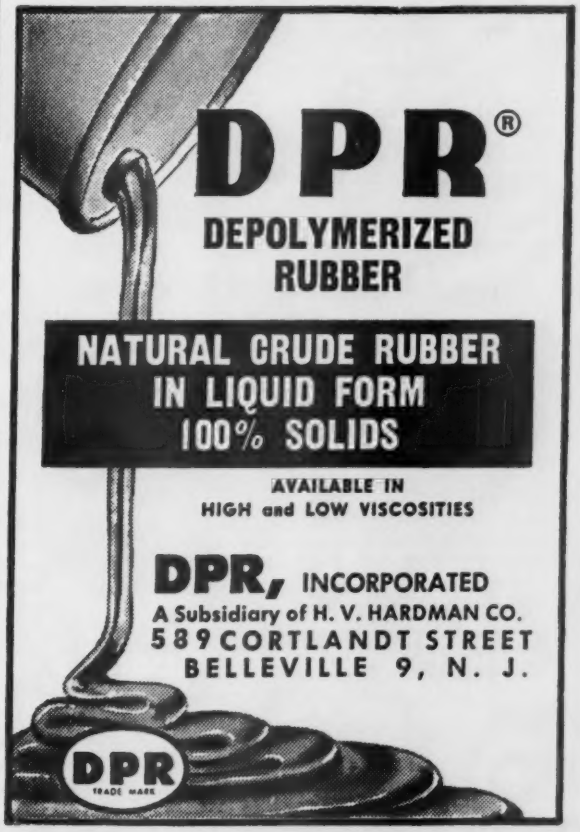

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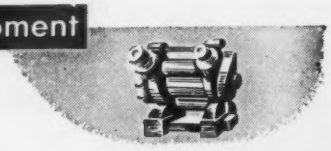
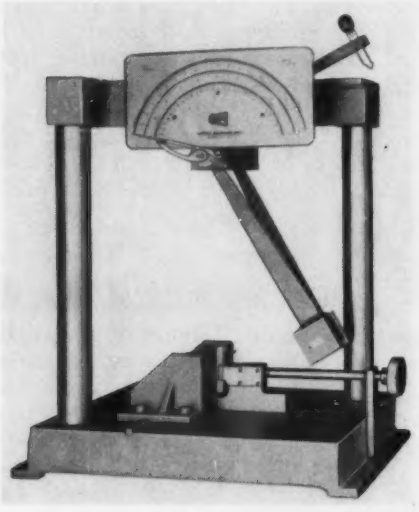


Tension-Impact Tester

► Testing Machines, Inc., 72 Jericho Turnpike, Mineola, N. Y., has developed a new tension-impact modification for the standard impact tester for plastics and ceramics. The tester incorporates a pendulum hammer with a two-jaw gripping device which holds the specimen during the downward swing of the pendulum. At the exact moment of impact, one part of the gripping device is arrested by a stop. The hammer continues its swing with the other part of the gripping device, and the specimen instantaneously is pulled apart. The resistance to the tensile-impact force is shown on a dial. The TMI Tension-Impact tester has a rugged construction; linear scales; correctly engineered center of gravity; large working area; and a wide range, the company states.



All-Hermetic Centrifuge

► An all-hermetic 5000-gallon-per-hour centrifugal separator, believed to have the highest capacity of its type, has been announced by The De Laval Separator Company, Poughkeepsie, N. Y. Designated the De Laval SRG-214, the machine is designed to separate or clarify viscous or inflammable materials, or materials which must be kept from contact with air. Of particular interest is the use of the machine for water washing some of the newly developed long-chain plastic materials under conditions of high temperature and pressures.

The SRG-214, is a disc-type constant efficiency centrifuge, with specially designed long-life seals at the inlet and outlets. The seals assure air-free

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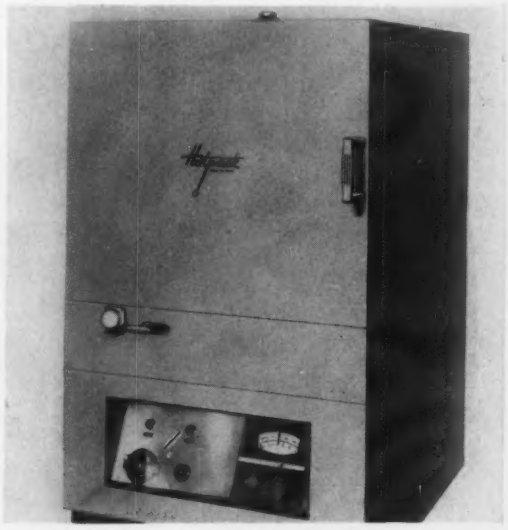
operation at pressures up to 125 psig, so that the feed material enters and is maintained under positive pressure. As a result, the machine is well-suited for high-capacity vegetable oil refining and degumming and for clarifying of materials such as synthetic latex and viscous plastics dissolved in solvent.

Except for the frame, which is heavy duty cast iron, all parts, including the bowl, bowl discs, bowl cover and outlets are of solid stainless steel construction. The machine, which requires 20 hp, can be used with either direct motor drive or supplied with V-belt pulley for separate motor drive. Bowl diameter is 24 inches and bowl speed is 4,400 rpm. The machine weighs approximately 2600 pounds less motor.

Mechanical Convected Oven

► A mechanical convected oven designed for short heat testing, drying, analytical work and other temperature testing and conditioning processes has been developed by Electric Hotpack Co., Inc., 5008 Cottman St., Philadelphia 35, Penna. The oven's temperature range is from 35° to 350°C. (662°F.) and a calibrated thermostat dial allows direct setting of the desired temperature to within 1°C. over the full temperature



range. A wattage selector switch regulates the input heater wattage, eliminating heat surges. As a safety feature, an automatic over-temperature controller breaks the heater circuit in the event the chamber temperatures exceed the control setting. This feature prevents costly damage resulting from overheating or unauthorized thermostat adjustments. The control panel is recessed at the bottom of the oven and is protected by a sturdy Plexiglass cover. The oven cabinet is constructed of heavy gage enameled steel and the interior finish is of 18-8 gage polished stainless steel.

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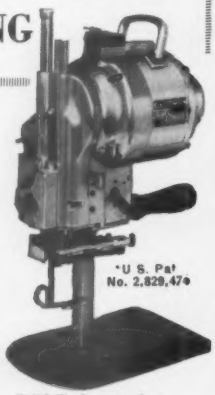

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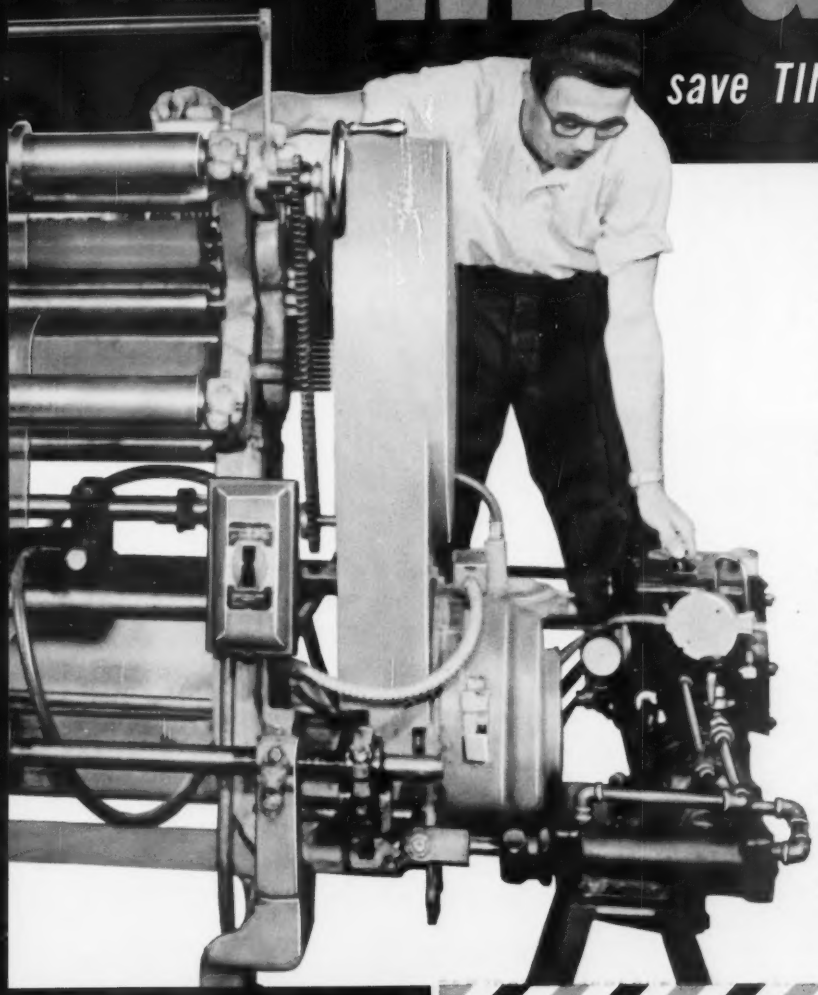

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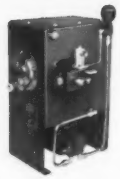

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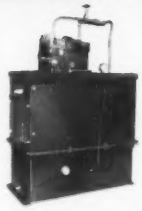

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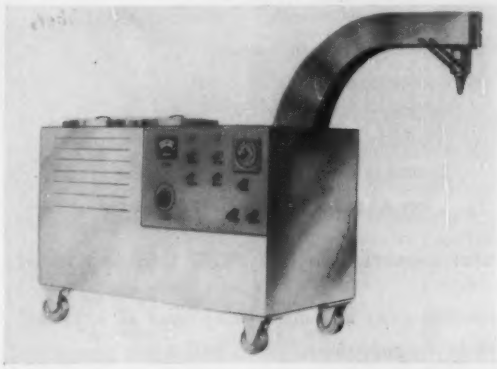
Cooling Unit and Pallet Piler

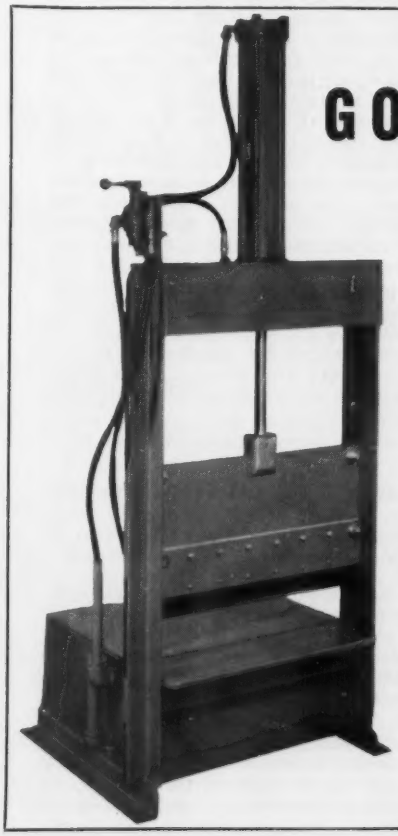
► The Type E Continuous Batch-Off Cooling Unit and Pallet Piler is designed to provide uniform control and cooling of continuous batch-off rubber at increased production speeds with a saving of space, manpower and material spoilage, reports the manufacturer, Mayer Refrigerating Engineers, Inc., Lincoln Park, N. J. The unit consists of the following components: airlift stripper conveyor; stearate dip tank; riser conveyor; cooling conveyor; and scorer pallet piler. All components are of standard construction with flexibility to meet specific plant requirements, the company states. In operation, the airlift stripper conveyor cuts the rubber to desired width at mill speeds and conveys the strips to the dip tank. The dip tank, containing the stearate, is equipped with cooling coils, a recirculating pump for washing off excess stearate, and an automatic float valve for control of the liquid level. The tank is of ample size to accommodate the total batch. The riser conveyor transfers the rubber from the dip tank to the cooling unit. The cooling conveyor is designed to cool the rubber to the desired internal temperature at a selective time period, ranging from 3 to 10 minutes. The scorer pallet piler, deep scores the rubber at the desired length and automatically folds it onto the pallet.

Urethane Foam Producing Machine

► Rogers Associates, Inc., Box 752, West Caldwell, N. J., has developed a machine for producing urethane foam which has all components mounted integrally in one compact mobile unit. According to the manufacturer, the machine was designed for simplicity so that operating personnel require no special training. The unit can be equipped with



an optional portable head which permits dispensing of foam 50 feet from the metering unit. The machine has an operating capacity of ½ to 80 pounds of foam per minute and an exact metering of components can be made no matter what the ratio, the company states. The machine is available with either intermittent or continuous delivery.



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Reviews

Linear and Stereoregular Addition Polymers: Polymerization with Controlled Propagation. By Norman G. Gaylord and Herman F. Mark. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y., 6 x 9 in. 571 pp. $17.50.

The recent discovery of stereospecific polymerization processes capable of producing high yields of sterically regulated polymers has opened up a new branch of macromolecular research which promises far-reaching developments of commercial importance. A virtual revolution has already transpired in the fields of high melting plastics, strong and resistant fibers, and synthetic rubber having superior performance in recovery and tread wear.

In the opinion expressed in the foreword by Professor Giulio Natta, one of the great pioneers in this field, only a life long authority on polymer science like Dr. Mark and an able writer like Dr. Gaylord could undertake to survey the thousands of monographs and patent applications in which the results of recent research are scattered. It is fortunate indeed that such well qualified authors undertook to present what is probably the only comprehensive and authoritative source of information on this constantly expanding subject today. Never before has the world-wide literature on this aspect of macromolecular investigations been collected and systematically ordered. Much of it has not yet been completely published in the English language.

In a logical preliminary to an account of new developments, this book begins with a few chapters on the mechanism of homogeneous addition polymerization, on complexes of heavy metal compounds with olefins and dienes, and on the principles of molecular symmetry and the synthesis of asymmetric compounds. However, the particular importance of this text lies in its synthesis of recent research including material up to March, 1959. A concise presentation of fluid-bed and fixed-bed polymerization processes is followed by sections on olefin oxides and polymers, a special review of patent examples with 26 tables of data, and a chapter on miscellaneous organo-metallic catalyzed polymerization systems.

Appendices have been used to encompass the very latest data. Such thoroughness, pertinacy and recency are likely to make this treatment of stereospecific polymerization the bible for the specialist in this field. It should help investigators in their search for ever new polymers with exceptional properties, still lower priced hydrocarbon monomers and more valuable products of yet greater variety.

•

Chemical Analysis of Resin-Based Coating Materials. Edited by C. P. A. Kappelmeier. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N.Y. 6 x 9 in. 630 pp. $19.50.

This work on the determination of the constituents of plastic coatings represents a worthy memorial to one of the international pioneers in the field, Dr. C. P. A. Kappelmeier, who developed the standard quantitative procedure for dicarboxylic acid analysis. While virtually blind, he compiled contributions from American, Dutch, German, English, Canadian and Swiss experts in the problems and techniques of analytical methods, completing the volume just before his death last year.

A thorough analytical discussion of the most important synthetic resins is followed by a concise review of the analysis of coating materials now in use, their identi-

fication and the determination of their components. As a guide to new analysts, a brief survey is conducted of general chemical principles in synthetic resin and other coating material composition. The extensive coverage is marred only by failure to treat the polycarbonates, polyethylene, polypropylene and some of the elastomer resins.

The analytical methods described include classical gravimetric procedures along with many of the newer techniques used in laboratories with the latest complex equipment. Two Swiss chemists have written an excellent account of complexiметric titration, and three Canadians contributed a fine article on infrared spectrophotometry. A Dutch author was responsible for the only two sections dealing specifically with rubber, concentrating on the rapid qualitative identification of chlorinated lacquers and compounds.

The chapter on water-latex systems describes coating techniques which can be adapted to the analysis of normal plastic components. In other respects, too, the editor has succeeded in suggesting promising approaches to research, as well as fashioning a practical reference work for analytical chemists.

BOOKLETS, CATALOGS, etc.

Mass & Paste Mixers—Ribbon Mixers. (Catalog "D"). Paul O. Abbé, Inc., 154 Center Ave., Little Falls, N. J. 8½ x 11 in. 11 pp.

This catalog provides technical data and specifications of paste mixers and ribbon mixers, as well as illustrations of equipment, various blade designs and arrangements, and other pertinent data. The paste mixers can process a variety of materials such as plastics, putties, smokeless powders, chewing gum, rubber cement, rubber and asbestos. The ribbon mixers blend a wide range of dry powders, liquids and slurries in batch or continuous processing. Several charts list dimensions, horsepower, mixing volume, shaft speed and other pertinent statistics.

•

Logan Hydraulic Presses and Preformers. Logan Hydraulics, Inc., 4901 W. Lawrence Ave., Chicago 30, Ill. 8½ x 11 in. 14 pp.

This catalog presents data on hydraulic presses and preformers for the thermoplastic molding industry. An introduction outlines the design features of a preformer line which includes models with 30, 50, 50 and 125-ton capacity. Units may be used with single, two and three cavity dies for faster production. Self-contained molding presses come in sizes ranging from 10 to 400 tons. Specification and illustrations are supplied for automatic and semi-automatic models whose pressures are adaptable to all types of molding materials.

•

A Handbook on Mulling. Simpson Mix-Muller Div., National Engineering Co., Machinery Hall, Chicago 6, Ill. 8½ x 11 in. 12 pp.

Working principles of blending dry semi-liquid and dry solid materials in a mortar-and-pestle type mixing machine are outlined in this booklet. Charts and photographs show the development of controlled dispersion for the chemical and process industries. Specifications, capacity data and suggestions for potential uses of spatulate action mixers are given. Also included is information on materials handling services and equipment, as well as a chart showing interpolation of weight per cubic feet of various materials.

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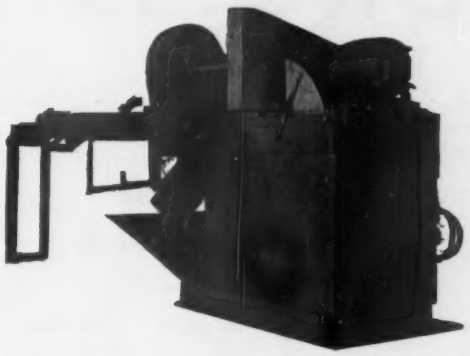
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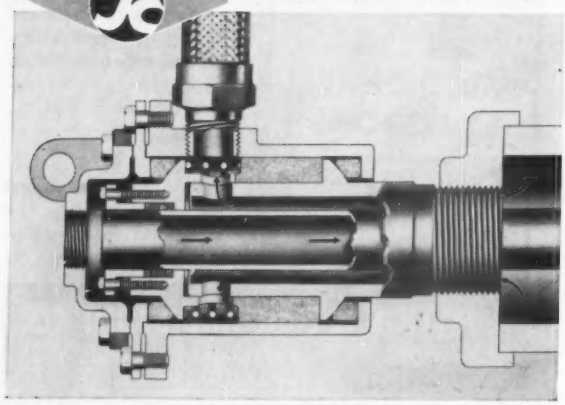

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REVIEWS (CONT'D)

Heels and Soles, Formulations and Compounding Techniques. Chemical Division of the Goodyear Tire and Rubber Co., Akron 16, Ohio. 8½ x 11 in. 36 pp.

This booklet lists formulating compounds which bring out the best in rubber stocks, taking into consideration varying requirements for hardness, abrasion resistance, specific gravity, color and cost. Included are the results of heel and sole compounding and testing studies conducted in the Goodrich Chemical development and technical service laboratories. Formulations for practically all specification requirements for major types of heels and soles as well as for toplifting and midsoling materials are given. New industry developments are discussed and in addition, there are chapters dealing with the application possibilities of Plioflex SBR polymers, Chemigum NBR rubbers and Pliolite reinforcing resins.

•

Achieving Better Designs with Custom-Built Elastomers. (Bulletin No. 902.) Lord Manufacturing Co., Erie, Penna. 8½ x 11 in. 6 pp.

Capabilities in design of custom-built elastomers are described with illustrated examples of custom-built elastomers that helped turn designers' ideas into useful products. The bulletin emphasizes that the feasibility of a new product idea may depend on the availability of the right elastomer. Also given is a two-page chart listing the general properties of 10 major elastomers. Origin and composition of natural rubber and nine synthetic elastomers are described with their physical and chemical properties; processing properties; and environmental resistance characteristics.

•

Pro-fax. Hercules Powder Co., 9th and Market Sts., Wilmington 99, Del. 8½ x 11. 20 pp.

The booklet provides an up-to-date summary of information on physical characteristics, mechanical properties, chemical resistance, electrical properties, injection molding, extrusion and fabrication of Hercules' polypropylene, Pro-fax. It is supplemented with tables, charts, photographs and descriptions of commercial applications. Various types of Pro-fax packaging and shipping data, and a bibliography of other Hercules information on polypropylene are also included.

•

Harshaw Vinyl Stabilizer Service to the Vinyl Plastic and Coating Industries. (Bulletin No. 60-1.) Harshaw Chemical Co., Cleveland, Ohio. 8½ x 11 in. 16 pp.

Assembled for plastics engineers and formulators in vinyl industries, this bulletin helps in the selection of vinyl stabilizers for use in their various applications. Two tables provide data in clear, simple form. Included are sections on vinyl stabilizers in calendering, extruding and injection molding applications; vinyl stabilizers in plastisols and modified plastisols; product information; special fields; and special effects.

•

Eastman—Supplier to the Rubber Industry. (Bulletin I-110.) Eastman Chemical Products, Inc., Kingsport, Tenn. 8½ x 11 in. 8 pp.

Chemicals for the rubber industry are discussed including antiozonants, antioxidants, adhesives, coating materials, waxes, solvents, plasticizers and intermediates, as well as several compounds used in the manufacture of polyurethanes. In addition to a description of the physical and chemical properties of these compounds and their uses, the brochure lists a number of test results in both natural and synthetic elastomer formulations.

MARKET REPORTS

TRENDS
NEWS
PRICES

Natural Rubber

Since our last report (March 1), the price of natural rubber on the New York Commodity Exchange has moved in a range of 163 points, high for the period being 41.63c reached on March 17, and low being 40.00c reached on March 7. The average price of spot rubber for the month of March was 40.74c based on 23 trading days. This compares with an average of 39.33c in the previous month.

The Administration has disclosed the terms under which it will sell over 400,000 long tons of stockpiled natural rubber under legislation now pending in Congress. Details on the graduated price scale of sales totals and prices became available as the House passed and sent to the Senate for action a resolution authorizing the rubber sales over the next few years. It is estimated that the original 470,000 long tons slated to be sold under the disposal program is valued at about $400 million.

Graduated Scale Details

The graduated scale will set a 30c per pound minimum on sales of the government-owned rubber. When the market falls below that figure, no stockpile sales will be made.

When the market ranges between 30 and 32c, the General Services Administration will sell 9,000 long tons per quarter.

When the price is between 32 and 34c, GSA will up the quarterly sales total to 18,000 long tons, and the total to be sold when the price is between 34 and 36c will rise to 27,000 long tons every three months.

When the price rises above 36c, there will be no limit on the amounts that GSA may offer on the market. Since GSA began selling stockpile rubber in October, 1959, under Congressional directive, the market price has never dipped under 36c.

Effect of Announcement

Some segments of the trade are of the opinion that the GSA schedule of prices is tantamount to a ceiling on rubber prices at the 36c level. It should be noted that the GSA selling price is almost identical with that of the Board of Trade in London.

The trade also believes that the GSA announcement may also tend to engender the belief that the U. S. consumer will not be subjected to any relatively higher prices for nearby rubber in the foreseeable future. It is believed that GSA will not sell rubber indiscriminately or in any manner which would disrupt the market. The net effect of the announcement, however, will have to wait consumption developments in the balance of the year.

NEW YORK, APRIL 1, 1960

Price Data

Closing Rubber Prices on New York Commodity Exchange

FROM MARCH 1 TO MARCH 31

Mar.	Spot	May	July	Sept.	Sales
1	41.00	40.00	39.10	38.50	28
2	40.75	39.80	38.80	38.20	44
3	40.50	39.75	38.90	38.36	63
4	40.25	39.50	38.60	38.10	11
5	....	....	....	....	..
6	....	....	....	....	..
7	40.00	39.20	38.30	37.75	44
8	40.13	39.25	38.50	38.10	84
9	40.50	39.93	39.15	38.60	88
10	40.50	40.00	39.05	38.50	64
11	40.50	39.75	38.90	38.30	29
12	....	....	....	....	..
13	....	....	....	....	..
14	40.75	40.00	39.05	38.60	48
15	40.75	39.75	39.00	38.35	7
16	41.13	40.40	39.55	38.90	93
17	41.63	40.95	40.00	39.50	120
18	41.50	40.85	39.95	39.45	217
19	....	....	....	....	..
20	....	....	....	....	..
21	41.00	40.55	39.70	39.00	68
22	40.25	40.30	39.50	38.80	41
23	40.50	40.25	39.45	38.90	127
24	41.00	40.65	39.80	39.20	36
25	41.00	40.50	39.66	39.10	44
26	....	....	....	....	..
27	....	....	....	....	..
28	41.00	40.49	39.68	39.15	22
29	41.00	40.80	40.15	39.65	68
30	41.13	40.85	40.40	39.85	139
31	40.25	40.20	39.60	39.15	144

Outside Market

No. 1 Ribbed Smokd Sheets:	
Spot	.40¼
May	.40⅜
June	.40
Thin Latex Crepe:	
Spot	.47
Thin Brown Crepe, No. 2	.40¼
Flat Bark Crepe	.36⅜

London Market
(Standard Smoked Sheets)

May	39.92 — 40.07
July-Sept.	39.33 — 39.48

Singapore Market
(Standard Smoked Sheets)

May	39.48 — 39.56

Middling Upland Quotations

	Feb. 29	March 31		
	Close	High	Low	Close
May	33.07	32.95	32.91	32.91
July	32.61	32.60	32.54	32.60
Oct.	30.75	30.75	30.73	30.72

Notes & Quotes

Dr. R. R. Dockson, dean of the School of Business Administration at the University of Southern California, in a recently issued report noted that barring a catastrophic war, the next 10 to 15 years will see a rapid increase in world trade and, as a consequence, "vast economic opportunities will unfold . . ." By 1975, he states, the United States will have production capabilities nearly double the current level.

Synthetic Rubber

The Rubber Manufacturers Association reports that 257,092 long tons of all types of synthetic rubber were produced in the United States in the first two months of this year, compared with the 210,801 long tons produced in the first two months of the preceding year.

In the first two months of 1960, exports of all types of synthetic rubber totaled 60,575 long tons, against the 33,327 long tons of synthetic exported in the first two months of the previous year.

Consumption of synthetic rubber in the first two months of this year amounted to 187,638 long tons, contrasted with the 177,029 long tons consumed in the first two months of 1959.

Production-Consumption Rates

At the current production rate, something like 1.3 long tons of synthetic rubber will be turned out in the United States this year. This is just about what most of the pundits have been expecting.

The current consumption rate points to a total yearly use of approximately 1.1 million long tons. Here again, earlier estimates were in accord.

It is only in the area of exports that the earlier estimates and the realities do not jibe. It had been assumed that because of the growing ability of the nations of the Free World to produce synthetic rubber that exports from the United States would fall to some extent.

If exports in 1960 continue the pace set in the first few months of the year a total of 400,000 long tons will have been exported by year end. Most estimates of the situation at the beginning of the year placed total exports at about 250,000 long tons.

Why Increased Exports?

One reason for high exports of synthetic rubber so far this year apparently lies in the remarkable European business pace. Notwithstanding the increased capacity to produce synthetic rubber, there is still a demand for more.

Domestic synthetic rubber consumption figures at this date do not reflect lowered automobile production. It may very well be that before too many more months roll by that consumption of synthetic rubber in the United States may not be as good as expected heretofore.

Fortunately, overseas markets will have taken up some of the slack so that in balance the total figures may not be too much in variance. All in all, and whatever the component factors, the synthetic rubber industry should enjoy a relatively excellent year in 1960.

PRICES OF COMMERCIALLY AVAILABLE

Dry Rubber

(per pound carload)

Butadiene-Acrylonitrile Types

Butaprene NF	.4900 [1]
Butaprene NH	.6500 [1]
Butaprene NL	.5000 [1]
Butaprene NXM	.5800 [1]
Chemigum N1NS	.6400 [2]
Chemigum N3NS and N5	.5800 [2]
Chemigum N6	.5000 [2]
Chemigum N6B	.5000 [2]
Chemigum N7	.5000 [2]
Chemigum N8	.5000 [2]
Chemigum N600	.5000 [2]
Herecol N-33	.6800 [1]
Hycar 1001 and 1041	.5800 [2]
Hycar 1002	.5000 [2]
Hycar 1014	.6000 [2]
Hycar 1042 and 1043	.5000 [2]
Hycar 1051	.5800 [2]
Hycar 1052	.5000 [2]
Hycar 1053	.5000 [2]
Hycar 1072	.6400 [2]
Hycar 1203	.4600 [2]
Hycar 1312	.5000 [2]
Hycar 1411	.6200 [2]
Hycar 1432	.5900 [2]
Hycar 1441	.6200 [2]
Paracril AJ	.4850 [2]
Paracril B and BJ	.5000 [2]
Paracril BLT and BJLT	.5000 [2]
Paracril C and CLT	.5800 [2]
Paracril CV	.6300 [2]
Paracril D	.6500 [2]
Paracril 18-80	.6000 [2]
Paracril OZO	.4600 [2]
Polysar Krynac 800	.5000 [1]
Polysar Krynac 801	.5800 [1]
Polysar Krynac 802	.5000 [1]
Polysar Krynac 803	.5000 [1]

Butadiene-Styrene Types

Ameripol 1000	.2410 [2]
Ameripol 1001	.2410 [2]
Ameripol 1002	.2435 [2]
Ameripol 1006	.2410 [2]
Ameripol 1006 (crumb)	.2475 [2]
Ameripol 1007	.2410 [2]
Ameripol 1009	.2475 [2]
Ameripol 1009 (crumb)	.2590 [2]
Ameripol 1011	.2475 [2]
Ameripol 1012	.2425 [2]
Ameripol 1012 (crumb)	.2490 [2]
Ameripol 1013	.2410 [2]
Ameripol 1013 (crumb)	.2615 [2]
Ameripol 1500 and 1501	.2410 [2]
Ameripol 1502	.2410 [2]
Ameripol 1605	.1900 [2]
Ameripol 1703	.2060 [2]
Ameripol 1705	.2035 [2]
Ameripol 1707	.1910 [2]
Ameripol 1708	.1910 [2]
Ameripol 1710	.1885 [2]
Ameripol 1712	.1885 [2]
Ameripol 1805	.1550 [2]
Ameripol 4600	.2410 [2]
Ameripol 4650	.1820 [2]
Ameripol 4651	.1770 [2]
Ameripol 4652	.1425 [2]
Ameripol 4654	.1870 [2]
Ameripol 4655	.1820 [2]
Ameripol 4659	.1820 [2]
Ameripol 4660	.1870 [2]
Ameripol 4700	.1750 [2]
Ameripol 4750	.1545 [2]
Ameripol 4751	.1400 [2]
Ameripol 4752	.1600 [2]
Ameripol 4753	.1480 [2]
Ameripol 4760	.1576 [2]
Ameripol 4759	.1600 [2]
Ameripol 4761	.1710 [2]
ASRC 1000	.2410 [2]
ASRC 1001 and 1004	.2410 [2]
ASRC 1006	.2410 [2]
ASRC 1009	.2475 [2]
ASRC 1018	.2700 [2]
ASRC 1019	.2650 [2]
ASRC 1500	.2410 [2]
ASRC 1502	.2410 [2]
ASRC 1503	.2625 [2]
ASRC 1703	.2060 [2]
ASRC 1708	.1910 [2]
ASRC 1712	.1885 [2]
ASRC 1713	.1750 [2]
TSRC 3105 and 3106	.2410 [2]
ASRC 3110	.2600 [2]
Baytown 1600	.1930 [2]
Baytown 1601	.1930 [2]
Baytown 1602	.1930 [2]
Baytown 1801	.1760 [2]
Baytown 1803	.1740 [2]
C-102 (Shell)	.2300 [2]
Carbomix 3750	.1820 [2]
Carbomix 3751	.1545 [2]
Carbomix 3752	.1845 [2]
Carbomix 3753	.1640 [2]
Carbomix 3756	.1569 [2]
Carbomix 3757	.1480 [2]
Carbomix 3758	.1545 [2]
Carbomix 3760	.1496 [2]
CB-102 (Shell)	.1850 [2]
Copo 1500	.2410 [2]
Copo 1502	.2410 [2]
Copo 1505 NS	.2610 [2]
Copo 1712	.1885 [2]
Copo 1773	.2060 [2]
Copo 1778	.1910 [2]
Copo 3700	.1725 [2]
Copo 3701	.1750 [2]
Copo 3900	.2310 [2]
FR-S 146	.2410 [2]
FR-S 158	.3000 [2]
FR-S 173	.2060 [2]
FR-S 178	.1910 [2]
FR-S 181	.2410 [2]
FR-S 182	.2410 [2]
FR-S 184	.1885 [2]
FR-S 1000	.2410 [2]
FR-S 1001	.1410 [2]
FR-S 1004	.2410 [2]
FR-S 1006	.2410 [2]
FR-S 1007	.2410 [2]
FR-S 1009	.2475 [2]
FR-S 1010	.2600 [2]
FR-S 1012	.2425 [2]
FR-S 1013	.2410 [2]
FR-S 1014	.2810 [2]
FR-S 1500	.2410 [2]
FR-S 1502	.2410 [2]
FR-S 1703	.2060 [2]
FR-S 1710	.1885 [2]
FR-S 1712	.1885 [2]
Gentro 1500	.2410 [2]
Gentro 1712	.1885 [2]
Gentro-Jet 9152	.2080 [2]
Gentro-Jet 9153	.1820 [2]
Gentro-Jet 9154	.1845 [2]
Gentro-Jet 9250	.1580 [2]
Gentro-Jet 9251	.1640 [2]
Gentro-Jet 9252	.1670 [2]
Gentro-Jet 9275	.1500 [2]
Naugapol 1016	.2650 [2]
Naugapol 1018	.2700 [2]
Naugapol 1019	.2650 [2]
Naugapol 1022	.2950 [2]
Naugapol 1023	.3150 [2]
Naugapol 1503	.2625 [2]
Naugapol 1504	.0330 [2]
Naugapol 6003	.2700 [2]
Naugapol 6100	.3100 [2]
OB-102 (Shell)	.1825 [2]
OB-104 (Shell)	.1475 [2]
OB-106 (Shell)	.1510 [2]
OB-110 (Shell)	.1410 [2]
OB-111 (Shell)	.1540 [2]
OB-113C (Shell)	.1750 [2]
OB-114C (Shell)	.1420 [2]
OB-116 (Shell)	.1810 [2]
Philprene 1000	.2410 [1]
Philprene 1001	.2410 [1]
Philprene 1006	.2410 [1]
Philprene 1009	.2475 [1]
Philprene 1018	.2700 [1]
Philprene 1019	.2650 [1]
Philprene 1500	.2410 [1]
Philprene 1502	.2410 [1]
Philprene 1503	.2625 [1]
Philprene 1601	.1930 [1]
Philprene 1603	.1960 [1]
Philprene 1605	.1900 [1]
Philprene 1703	.2060 [1]
Philprene 1708	.1910 [1]
Philprene 1712	.1885 [1]
Philprene 1803	.1740 [1]
Philprene 1805	.1550 [1]
Plioflex 1006	.2410 [2]
Plioflex 1500C	.2410 [2]
Plioflex 1502	.2410 [2]
Plioflex 1507	.2410 [2]
Plioflex 1508	.2410 [2]
Plioflex 1510	.2410 [2]
Plioflex 1710C	.1885 [2]
Plioflex 1712C	.1885 [2]
Plioflex 1713	.1750 [2]
Plioflex 1714C	.1725 [2]
Plioflex 1773	.2060 [2]
Plioflex 1778	.1910 [2]
Polysar Kryflex 200	.2510 [2]
Polysar Krylene	.2410 [2]
Polysar Krylene NS	.2410 [2]
Polysar Krynol 651	.1885 [2]
Polysar Krynol 652	.1910 [2]
Polysar S	.2410 [2]
Polysar S-50	.2410 [2]
Polysar S-X 371	.2550 [2]
Polysar SS 250	.2875 [2]
S-1000	.2300 [2]
S-1002	.2325 [2]
S-1006	.2300 [2]
S-1009	.2400 [2]
S-1011	.2325 [2]
S-1013	.2300 [2]
S-1500	.2300 [2]
S-1502	.2300 [2]
S-1509	.2300 [2]
S-1600	.1825 [2]
S-1602	.1825 [2]
S-1604	.1825 [2]
S-1605	.1800 [2]
S-1606	.1750 [2]
S-1607	.1750 [2]
S-1703	.1950 [2]
S-1707	.1800 [2]
S-1709	.1775 [2]
S-1710	.1775 [2]
S-1712	.1775 [2]
S-1778	.1800 [2]
S-1800	.1475 [2]
S-1802	.1410 [2]
S-1803	.1630 [2]
S-1804	.1750 [2]
S-1806	.1510 [2]
S-1807	.1540 [2]
S-1808	.1420 [2]
S-7652	.1875 [2]
S-7701	.1850 [2]
SP-103 (Shell)	.2900 [2]
Synpol 1000	.2410 [1]
Synpol 1001	.2410 [1]
Synpol 1002	.2435 [1]
Synpol 1006	.2410 [1]
Synpol 1007	.2410 [1]
Synpol 1009	.2475 [1]
Synpol 1012	.2425 [1]
Synpol 1013	.2410 [1]
Synpol 1061	.2410 [1]
Synpol 1500	.2410 [1]
Synpol 1502	.2410 [1]
Synpol 1551	.2410 [1]
Synpol 1703	.2060 [1]
Synpol 1707	.1910 [1]
Synpol 1708	.1910 [1]
Synpol 1712	.1885 [1]
Synpol 8103	.2401 [2]
Synpol 8151	.1820 [2]
Synpol 8152	.1860 [2]
Synpol 8200	.1910 [2]
Synpol 8201	.1750 [2]
Synpol 8202	.1725 [2]
Synpol 8208	.1750 [2]
Synpol 8255	.1480 [2]
Synpol 8253	.1584 [2]
Synpol 8254	.1545 [2]
Synpol 8266	.1598 [2]
Synpol 8267	.1640 [2]

Butyl Rubbers

Enjay Butyl 035 and 150	.2300 [2]
Enjay Butyl 165 NS	.2400 [2]
Enjay Butyl 215	.2300 [2]
Enjay Butyl 217	.2300 [2]
Enjay Butyl 218	.2300 [2]
Enjay Butyl 268 NS	.2400 [2]
Enjay Butyl 325	.2300 [2]
Enjay Butyl 365 NS	.2400 [2]
Polysar Butyl 100	.2450 [2]
Polysar Butyl 101	.2775 [2]
Polysar Butyl 200 and 300	.2450 [2]
Polysar Butyl 301	.2550 [2]
Polysar Butyl 400	.2450 [2]

Chlorosulfonated Polyethylene

Hypalon 20	.4700 [2]
Hypalon 30	.6000 [2]
Hypalon 40	.5000 [2]

Fluoroelastomers

Kel-F Fluorel	$15.00 [2]
Kel-F 3700 and 5500	$16.00 [2]
Vitron A and A-HV	$10.00 [2]
Viton B	$13.00 [2]

Neoprene

(prices f.o.b.)

Neoprene Types AC and CG	.5500 [1]
Neoprene Type AD	.5500 [1]
Neoprene Type FB	.6500 [1]
Neoprene Type GN	.4100 [1]
Neoprene Type GN-A	.4100 [1]
Neoprene Type GRT	.4200 [1]
Neoprene Type KNR	.7500 [1]
Neoprene Type S	.4200 [1]
Neoprene Type W	.3900 [1]
Neoprene Type WB	.4100 [1]
Neoprene Type WHV	.3900 [1]
Neoprene Type WRT	.4500 [1]
Neoprene Type WX	.4100 [1]

SYNTHETIC RUBBER POLYMERS

Polysulfide Rubbers

	(prices l.c.l.)
Thiokol Type A	.5000 [3]
Thiokol Type FA	.6900 [3]
Thiokol Type ST	1.2500 [3]

Silicone Rubbers*

	(prices l.c.l.)
GE (compounded)	2.50 [3]
GE Silicone Gum (not compounded)	4.00 [3]
Silastic (compounded)	2.50 [3]
Silastic (gums)	4.00 [3]
Union Carbide (gums)	4.00 [3]
Union Carbide (compounds)	2.50 [3]

Latex

(per pound carload)

Butadiene-Acrylonitrile Types

Butaprene N-300	.4600 [1]
Butaprene N-400 and N-401	.5400 [1]
Chemigum 200	.4800 [3]
Chemigum 235	.5300 [3]
Chemigum 236	.5300 [3]
Chemigum 245	.4500 [3]
Chemigum 246	.4500 [3]
Chemigum 247	.4500 [3]
Chemigum 248	.4500 [3]
Hycar 1512	.4500 [3]
Hycar 1551	.5300 [3]
Hycar 1552	.4500 [3]
Hycar 1561	.5300 [3]
Hycar 1562	.4500 [3]
Hycar 1571	.5300 [3]
Hycar 1572	.4500 [3]
Hycar 1577	.4500 [3]
Nitrex 2612	.4500 [1]
Nitrex 2616	.5300 [1]
Nitrex 2620	.4500 [1]
Nitrex 2625	.4500 [1]
Tylac 640	.4500 [1]
Tylac 740	.4900 [1]
Tylac 840	.5300 [1]
Tylac 1640	.5400 [1]
Tylac 2241	.5300 [1]
Tylac 2430	.5000 [1]
Tylac 2570	.5300 [1]
Tylac 2830	.4500 [1]

Butadiene-Styrene Types

CL-101 (Shell)	.2800 [3]
Copo 2000	.2775 [3]
Copo 2101	.3000 [3]
Copo 2102	.3200 [3]
Copo 2105	.3200 [3]
Copo 2108	.3000 [3]
Copo 2109	.2775 [3]
Copo 2110	.3200 [3]
Copo 3852	.2900 [3]
FR-S 110	.3000 [3]
FR-S 150	.3000 [3]
FR-S 151	.2900 [3]
FR-S 174	.2950 [3]
FR-S 176	.2775 [3]
FR-S 2000	.2775 [3]
FR-S 2001	.2775 [3]
FR-S 2002	.3000 [3]
FR-S 2003	.3050 [3]
FR-S 2004	.3050 [3]
FR-S 2006	.2900 [3]
FR-S 2105	.3200 [3]
Naugatex 2000	.2775 [1]
Naugatex 2001	.2775 [1]
Naugatex 2002	.3000 [1]
Naugatex 2006	.2900 [1]
Naugatex 2105	.3200 [1]
Naugatex 2107	.3200 [1]
Naugatex 2108	.3000 [1]
Naugatex 2113	.2900 [1]
Naugatex J-8174	.3200 [1]
Naugatex J-8535	.3000 [1]
Pliolite 2000	.2775 [3]
Pliolite 2001	.2775 [3]
Pliolite 2076	.2900 [3]
Pliolite 2104	.3200 [3]
Pliolite 2105	.3200 [3]
Pliolite 2107	.3200 [3]
Pliolite 2108	.3000 [3]
S-2000 and S-2006	.2600 [3]
S-2101	.2600 [3]
S-2105	.2800 [3]
S-2108	.2900 [3]

Neoprene

Neoprene Latex 60	.4000 [3]
Neoprene Latex 571	.3700 [3]
Neoprene Latex 572	.3900 [3]
Neoprene Latex 601-A	.4000 [3]
Neoprene Latex 673	.5000 [3]
Neoprene Latex 735	.3800 [3]
Neoprene Latex 736	.3800 [3]
Neoprene Latex 842-A	.3700 [3]
Neoprene Latex 950	.4700 [3]

Polysulfide Rubbers

Thiokol Type MX	.8000 [3]
Thiokol Type WD-2	1.2500 [3]
Thiokol Type WD-6	.8000 [3]

Notes: (1) Freight allowed. (2) Freight extra. (3) Freight prepaid. *Covers a wide range of compounds. Readers are urged to check specific prices with producers.

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MARKETS

(continued)

Reclaimed Rubber

Figures made available by the Rubber Manufacturers Association point out that in the first two months of the current year a total of 53,467 long tons of reclaimed rubber were produced in the United States, compared with the 51,080 long tons produced in the first two months of the preceding year.

As for consumption, in the first two months of this year a total of 51,792 long tons of reclaimed rubber were used, against the 49,473 long tons consumed in the first two months of 1959.

It will thus be seen that both production and consumption are running slightly ahead of 1959 at this point. There is still every indication that the reclaimed rubber segment will enjoy a good year. Current prices follow:

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.11½
First Line Whole Tire	.11
Second Line Whole Tire	.10½
Third Line Whole Tire	.10¼
Fourth Line Whole Tire	.09¾
Black Carcass	.15¼
No. 1 Light Colored Carcass	.22
No. 1 Peel	.11
Butyl Tube Reclaim	.14
Natural Rubber Black Tube	.16
Natural Rubber Red Tube	.21
Natural Rubber Gray Tube	.21

Scrap Rubber

Fairly good activity has been noted in the scrap rubber market during the past few weeks with prices generally holding at previously quoted levels. It has been reported by the Rubber Manufacturers Association that 49,068 long tons of scrap rubber were consumed in the United States in the first two months of the current year.

The consumption rate to date points to a close to 300,000 long ton consumption for scrap rubber in 1960, or what had been expected some months ago.

Of course, the slightly slower pace in automobile production, which was not expected earlier this year, may have its over-all effect upon the scrap rubber market. In balance, however, 1960 continues to look fairly good.

(Prices Delivered Akron)

Mixed tires	ton	15.00
Light colored carcass	lb.	.05½
No. 1 peelings	ton	45.00
No. 2 peelings	ton	28.00
No. 3 peelings	ton	23.00
Buffings	ton	16.00
Truck and Bus S.A.G.	ton	22.00
Passenger S.A.G.	ton	20.00
Natural Rubber Red Tubes	lb.	.07½
Natural Rubber Black Tubes	lb.	.06¾
Butyl Rubber Tubes	lb.	.08

Tire Fabrics

American Enka Corp., heavily engaged in the manufacture of high-strength rayon tire yarn is going to produce nylon tire yarn according to a recent announcement. Enka announced that it will have 6.5 million pounds of annual capacity to make "heavy denier" nylon by next year.

According to company officials, the new capacity will be used for the production of nylon yarn for tires, home furnishings, cordage, carpeting and auto upholstery. Tires, however, are known to be the biggest market.

The company will start producing heavy denier nylon yarn at the annual rate of 3.5 million pounds by the fall of 1960. The nylon is type 6. Previously, Enka made type 6 in higher, or finer deniers for textile uses.

Allied Chemical Expanding

Allied Chemical Corp. has announced another phase of its multi-million dollar nylon expansion program which will increase its synthetic fiber capacity for all types of nylon yarn to over 80 million pounds per year. This new expansion represents a large-scale entry into the field of apparel fiber. The company tripled its capacity for Golden Caprolan nylon yarns, which are used in tire cord, last January.

Dow Chemical has also revealed plans for the expansion of its nylon 6 facilities with a new plant of 12 million pound capacity. Output will be channeled to the tire cord market. Construction will start immediately and operation is scheduled for 1961.

It will thus be noted that new fuel will be added to the nylon-Tyrex controversy. Additional nylon capacity will mean that new pressures will be brought to bear upon the rayon segment with some producers having large interests on both sides of the line.

Since the battle seems to be resolving itself at the price level, the ultimate consumer would seem to be the beneficiary. The controversy is not likely to be resolved until some automobile manufacturer adopts one fiber or another for his original equipment tires.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.62½
1650	lb.	.62
2200	lb.	.62½

Nylon Tire Cord

210	lb.	1.75
840	lb.	1.47

Rayon Graded Fabric

1100	lb.	.69
1650	lb.	.63½
2200	lb.	.63

Cotton Chafers

8.9 oz. (per square yard)	lb.	.71
9.25 oz. (per square yard)	lb.	.72
11.65 oz. (per square yard)	lb.	.66
14.4 oz. (per square yard)	lb.	.75

Liquid Latex

Natural: It is reported by the Rubber Manufacturers Association that in the first two months of this year a total of 9,774 long tons of natural latex were imported into the United States against the 14,320 long tons imported in the first two months of the preceding year.

As for consumption, in the first two months of this year a total of 10,917 long tons of natural latex were consumed, contrasted with the 13,673 long tons consumed in the first two months of the previous year.

Natural rubber latex is currently selling at 47 to 48c per pound in car load lots at East Coast ports despite the drops in both consumption and imports. Two factors now seem to be influencing the market. (1) The relatively high price, and (2) the fact that several latex foam producers have either curbed or discontinued production.

It does not now appear that more than 60,000 long tons of natural rubber latex will be consumed in 1960, at least so long as the high price structure is in evidence.

Synthetic: Where synthetic latex may also suffer because of curbs in latex foam production, the effect is not expected to be as severe as in natural latex. For one, synthetic latex enjoys a relatively stable price structure and this is an attraction which should not be underestimated. Last year, over 105,000 long tons of synthetic latex were consumed. This year, it appears likely that the total will be closer to 95,000 long tons.

Cotton

The price of middling uplands on the New York Cotton Exchange moved in the rather narrow range of 85 points since our last report (March 1), high for the period being 34.10c reached on March 25 and four other days in the period, and low being 33.25c reached on March 1 and on fourteen other days during the month.

The International Cotton Advisory Committee states that world cotton stocks are expected to drop about 750,000 bales to about 16,750,000 bales with world consumption hitting about 31,000,000 bales.

ICAC said that end-season stocks in the United States should drop about 1,000,000 bales to about 8,000,000 bales, with disappearance totaling 15,700,000 bales against 14,700,000 bales in the crop. U. S. consumption is estimated at 9,200,000 bales and exports at between 6,000,000 and 7,000,000 bales.

Outside the U.S., ICAC said stocks are expected to decline by some 500,000 bales to near the lowest level since the end of the war. Stocks in many instances will be below the "irreducible minimum." World consumption, according to ICAC, will reach close to 31,000,000 bales, compared with 29,100,000 last season.

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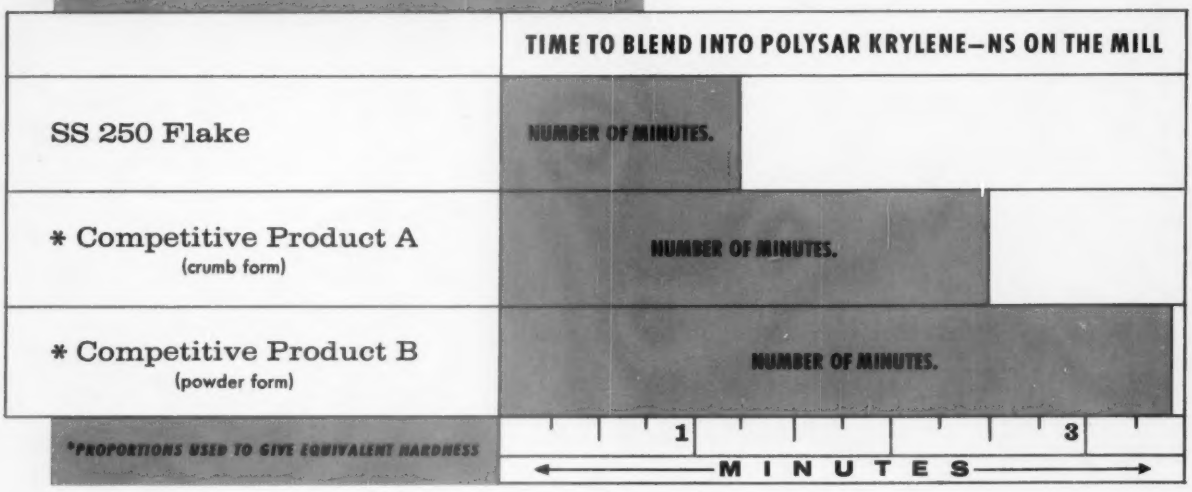

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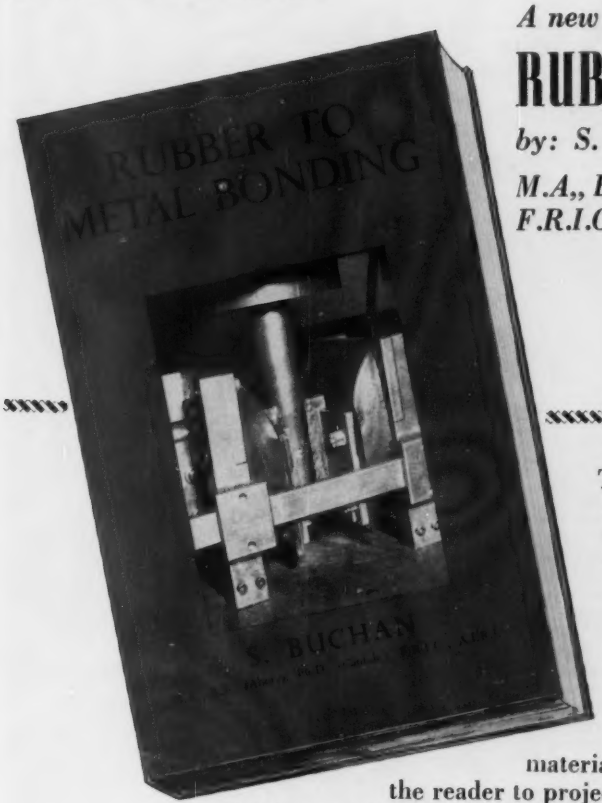

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Abbreviations: bbls., barrels; c.l., carload; cyl., cylinder; dlvd., delivered; dms., drums; eqld., equalized; l.c.l., less than carload; M.B. masterbatch; min., minimum; ref., refined; sap., saponified; sp., special; syn., synthetic; t.c., tank cars.

*Trademark. †For Export Only.

The arrangement of this section closely follows the Chemical Section of the 1959 RUBBER RED BOOK. Readers are referred to that edition for the correct classification of any material or brand name. Suppliers of every material are contacted for price information. However, only those materials are listed for which quotations have been furnished within the past six months. The quotations are not guaranteed and prospective purchasers should contact suppliers for information. Suppliers are requested to send current price information to the Market Editor, RUBBER AGE.

ACCELERATORS

A-1 (Thiocarbanilide)*	lb.	.74	.81
A-32*	lb.	.66	.80
A-100*	lb.	.52	.66
Accelerator No. 8*	lb.	—	1.25
Accelerator—49*	lb.	.59	.60
Accelerator 108*	lb.	—	.92
Accelerator—552*	lb.	—	2.25
Accelerator—808*	lb.	.66	.68
Accelerator—833*	lb.	1.17	1.19
Accelerator B*	lb.	—	.92
Altax*	lb.	.54	.56
Amax*	lb.	.75	.77
No. 1*	lb.	.71	.73
Ancap*(†)	lb.	.38	.40
Ancatax*(†)	lb.	.48	.50
Ancazate BU (ET & ME)*(†)	lb.	—	1.07
Ancazide ET*(†)	lb.	—	1.07
ME*(†)	lb.	—	1.14
Arazate*	lb.	—	2.25
Arquad 12*	lb.	.55	.61
Beutene*	lb.	.66	.68
Biamate, Rodform*	lb.	—	3.00
Butazate 50D*	lb.	.87	.89
Butyl Eight*	lb.	1.10	1.35
Butyl Namate	lb.	.45	.50
Captax*	lb.	.44	.46
C-P-B*	lb.	—	1.95
Cumate, Rodform*	lb.	—	1.45
Cydac*	lb.	.71	.73
Delac S*	lb.	.71	.73
DIBS*	lb.	—	.85
Diorthotolyguanidine	lb.	.69	.70
Dipac*	lb.	—	.85
Diphenylguanidine	lb.	.49	.50
Dithiocarbamates			
Cyzate B & E	lb.	.85	.89
El-Sixty*	lb.	.62	.69
Ethazate*	lb.	—	1.04
50D*	lb.	.87	.89
Ethyl Thiurad*	lb.	—	1.04
Ethyl Tuex*	lb.	—	1.04
Ethylac*	lb.	.93	.95
Geigy Amines	lb.	.46	.52
Guantal*	lb.	.62	.69
Hepteen Base*	lb.	—	1.85
Kure-Blend MT*	lb.	—	.70
Ledate, Rodform*	lb.	—	1.04
MBT-XXX*	lb.	.55	.57
MBTS Grains*	lb.	.60	.62
Merac*	lb.	.75	1.05
Mercaptobenzothiazol	lb.	.44	.46
Mercaptobenzothiazyl Disulfide	lb.	.54	.56
Mertax*	lb.	.55	.62
Methazate*	lb.	—	1.04
Monex*	lb.	—	1.14
Mono Thiurad*	lb.	—	1.14
2-MT	lb.	.88	.90
NA-22* (for neoprene)	lb.	—	1.05
NOBS No. 1*	lb.	.71	.73
Special*	lb.	.75	.77
O-X-A F	lb.	.55	.57
Pennac SDB*	lb.	.45	.48
Pentex*	lb.	—	1.24
Flour*	lb.	—	.30
Permalux (Neoprene)*	lb.	—	2.25
Phenex*	lb.	.60	.65
Polyac*	lb.	—	1.85
R-2 Crystals*	lb.	—	4.35
Rotax*	lb.	.55	.57
RZ-50-A* and B*	lb.	.70	1.00
Santocure*	lb.	.71	.73
NS*	lb.	.71	.73
26*	lb.	.75	.77
Selenac* (Ethyl, Methyl)	lb.	—	3.00
Seleram, Ethyl	lb.	—	3.00
Setsit-5*	lb.	.75	1.05
9*	lb.	.85	1.15
SPDX-GH*	lb.	.77	.79
GL*	lb.	1.20	1.30
Tellurac*	lb.	—	1.55
Tepidone*	lb.	.45	.45
Tetrone A*	lb.	—	1.98
Thiate A*	lb.	.88	—
B*	lb.	1.03	1.25
Thiazole ZMBT	lb.	.55	.57
Thiofide*	lb.	.54	.61
Thionex*	lb.	—	1.14
Thiotax*	lb.	.44	.51
Thiram, Ethyl	lb.	—	1.04
Methyl	lb.	—	1.14
Thiurad*	lb.	—	1.14
Thiuram E*	lb.	—	1.04
M*	lb.	—	1.14
Cyuram DS & MS	lb.	1.14	1.14
Trimene*	lb.	.56	.58
Base*	lb.	1.03	1.06
Triphenyl Guanidine	lb.	—	.90
Tuads* (Ethyl)	lb.	—	1.04
Tuads* (Methyl)	lb.	—	1.14
Tuex*	lb.	—	1.14
Ultex*	lb.	1.15	1.20
Unads*	lb.	—	1.14
Vulcacure NB*	lb.	.45	.45
NS*	lb.	.75	1.05
TMD*	lb.	—	1.14
ZII*, ZE*, ZM*	lb.	.85	.89
Z-B-X*	lb.	—	2.45
Zenite*	lb.	.54	.56
Zenite A*	lb.	.69	.71
Zenite AM*	lb.	.76	.78
Zenite Special*	lb.	.55	.57
Zetax* (uncoated)	lb.	.55	.57
Zimate* (Butyl)	lb.	—	1.04
Zimate* (Ethyl)	lb.	—	1.04
Zimate* (Methyl)	lb.	—	1.04
Zimate Slurry 50% solids content (Butyl, Ethyl & Methyl)	lb.	.85	.89
Ziram, Butyl	lb.	—	1.04
50% Dispersion	lb.	.85	.89
Ziram, Ethyl	lb.	—	1.04
50% Dispersion	lb.	.85	.89
Ziram, Methyl	lb.	—	1.04
50% Dispersion	lb.	.85	.89

ACTIVATORS

Blue Lead Sublimed	lb.	.17	.18
Cottonseed Fatty Acids			
Drew Wecoline C*	lb.	.17¾	.19
Wochem 210* and 211*	lb.	.16¾	.19¼
Fish Oil, Hydrogenated, Fatty Acid			
DAR-S* (dlvd.)	lb.	.12	.14½
DAR-HY* (dlvd.)	lb.	.15¼	.17¾
Hydrofol Acids* (dlvd.)	lb.	.15	.25¼
Hyfac 430* (dlvd.)	lb.	.18	.20½
Neo-Fat H.F.O.* (dlvd.)	lb.	.14½	.15¾
Neutrex* (dlvd.)	lb.	.14¼	.18¾
Stearite*	lb.	.11¾	.14¼
Talene*	lb.	.16¼	.18¾
Lime, Hydrated			
Arrowhead*	ton	—	21.00
Marblehead*	ton	—	19.25
Sierra*	ton	—	22.50
Litharge			
Eagle-Picher* (c.l.)	lb.	.13¾	—
National Lead*	lb.	—	.13¾
SB* (dlvd.)	lb.	—	.18½
Magnesium Oxide, Heavy			
General Magnesite 500*	lb.	.05½	.06
600*	lb.	.06½	.07
Kaiser 325*	lb.	.03½	.06½
Michigan No. 15*	lb.	.05½	.06½

ACTIVATORS (Cont'd)

Magnesium Oxide, Light			
Carey Mag*	lb.	.25¼	.26
General Magnesite* (neoprene grade)	lb.	.26¾	.28¾
General Magnesite No. 101*	lb.	.24¾	.27¼
Genmeg MLW*	lb.	.25¼	.27¾
Light Calcined Magnesia			
No. X-01*	lb.	.25¼	.26
Maglite D*	lb.	.25¼	—
K*	lb.	.25¾	.27
L*	lb.	.29¾	.30¾
M*	lb.	.27	.28¼
Seamag*	lb.	.20	.22
Marmag*	lb.	.24¾	.26
Michigan No. 30*	lb.	.24½	.26½
Michigan 1782 Magnesia*	lb.	.25¼	.26½
Neomag Powder*	lb.	.29¼	.30
Pellets*	lb.	.31¾	.32
Oleic Acid			
Dar-Chem* 105	lb.	.16¼	.18¾
Drew Wecoline OO*	lb.	.17¾	.19
Emersol 210* (dlvd.)	lb.	.16¼	.18¾
Groco Red Oil	lb.	.16¼	.18¾
Neo-Fat 92-04*	lb.	.20½	.22½
94-04*	lb.	.18½	.20½
Wochem 310, 311	lb.	.16¼	.18¾
Palm Fatty Acids			
Groco 45*	lb.	.15¾	.18¼
Neo-Fat*	lb.	.15¾	.17¾
Wochem 260*	lb.	.15¾	.18¼
281*	lb.	.16¼	.18¾
Potassium Oleate (dms.)	lb.	.48	.73
Drew 24%*	lb.	.20	.73
Red Lead			
Eagle-Picher* (c.l.)	lb.	.14½	—
National Lead*	lb.	.14½	.14¾
No. 2 RM* (dlvd.)	lb.	—	.18½
Sodium Laurate, 75%	lb.	.64	.89
Sodium Oleate, 75%	lb.	.54	.79
Paste (dms.)	lb.	.39	.64
Sodium Stearate, 75%	lb.	.47	.72
Stearic Acid, Single Pressed			
Emersol 110* (dlvd.)	lb.	.15¼	.17¾
Groco 53*	lb.	.15¾	.18¼
Neo-Fat 18-53*	lb.	.14¾	.16¾
Dar-Chem 11*	lb.	.15¼	.17¾
Wochem 730*	lb.	.12¼	.14¾
Stearic Acid, Double Pressed			
Dar-Chem 12*	lb.	.15¾	.18¼
Emersol 12* (dlvd.)	lb.	.15¾	.18¼
Groco 54*	lb.	.15¾	.18¼
Hydrofol Acid 444	lb.	.12	.14½
Neo-Fat 18-54*	lb.	.15¼	.17¼
Wecoline 200*	lb.	.14¾	.16
1000*, 1500*	lb.	.12	.13¼
Wochem 731*	lb.	.14¾	.17¼
Stearic Acid, Other			
Extra Pearlstearic* (dlvd.)	lb.	.17½	.20
Groco 56*	lb.	.12	.14½
Neo-Fat 18*	lb.	.18½	.20½
18-58*	lb.	.14¼	.16¼
18-61*	lb.	.16¼	.18¼
Stearex* (dlvd.)	lb.	.11¾	.13
Stearite*	lb.	.11¼	.13¼
Wecoline 300*	lb.	.15¾	.16½
Wochem 720*	lb.	.10¾	.13¼
721*	lb.	.10½	.13¼
732*	lb.	.15¾	.18¼
White Lead Basic Carbonate	lb.	.18	.19
White Lead Basic Sulfate	lb.	.17	.18
Zinc Laurate			
Laurex*	lb.	.37	.39
Zinc Stearate	lb.	.41	.46
Aquazinc K.C.*	lb.	.30	.55
Crown Brand*	lb.	.39	.44

Unclassified Activators

Aktone*	lb.	.21¼	.23¼
Barak*	lb.	—	.65
Curade*	lb.	.57	.59
Dibenzo G-M-F	lb.	—	2.60
D-B-A*	lb.	—	1.95
G-M-F*	lb.	—	2.60
Dibutylamine (dlvd.)	lb.	.55½	.56½
MODX*	lb.	.38	.40
Neo Fat 42-07*	lb.	.10¼	.12¼
Ridacto* (dms.)	lb.	.25	.26
Snodotte* (dlvd.)	lb.	.18½	.21
Vimbra	lb.	.32	.38½
Vulklor*	lb.	.88	.98

ANTI-COAGULANTS

Aqua Ammonia* (dms.)	lb.	.031	.035
M.B.M.C.* (l.c.l.)	lb.	.54	.76

Not the finished adhesive, just the heart of it—the resin—is what we make.

Making an adhesive for tough jobs?

Try adding a pinch of permanence

A powerful grip—tighter than rivets—bonds the brake lining to the brake shoe.

This bond must hold fast despite sudden stops that heat up the lining; despite wheel vibration, driving rain, spattering oil and grease—through weather ranging from subzero cold to superhighway hot.

In millions of cars, the adhesive that does this job is made with a Durez phenolic resin.

We work closely with people who make adhesives for tough bonding jobs. We supply the pinch of permanence—the resin that gives a good adhesive its gripping power, its heat resistance, surface tack, and hardness or flexibility.

We've been specializing in phenolic resins for 39 years; have developed thousands of resin formulations; are constantly developing new ones. If there's a way we can help you solve an adhesive formulation problem, we're eager to know about it. For details on Durez resins and the service that goes with them, write us.

DUREZ PLASTICS DIVISION

104 WALCK ROAD, NORTH TONAWANDA, N. Y.

HOOKER CHEMICAL CORPORATION

HOOKER CHEMICALS PLASTICS

ANTI-FOAMING AGENTS

Aero Anti Foam H*	lb.	——	**.20**
Regular*	lb.	——	**.12**
Anhydrol 6991*	lb.	.51	.56
D.C. Antifoam A*	lb.	5.45	6.65
Antifoam A Emulsion*	lb.	2.05	2.85
Antifoam AF Emulsion*	lb.	2.05	2.85
Antifoam B*	lb.	.65	1.20
Defoama W-1701*	lb.	——	**.12½**
Defoamer A-25*	lb.	——	**3.00**
Defoamer 630*	lb.	——	.14
Deltyl Prime	lb.	.70	.80
Foamnix*	lb.	.60	1.50
G-E Antifoam SS-24*; 66*	lb.	5.28	6.65
60 Emulsion*	lb.	2.05	3.75
Igepol CO-210	lb.	——	.36
Kessco X-3* (dms.)	lb.	——	.39
X-180*	lb.	——	.28
X-181*	lb.	——	**.36½**
Nopco 1407*	lb.	.20½	.22½
1497-V*	lb.	.15¼	.17¼
1907-B*	lb.	.22½	.25
JMK*	lb.	.48½	.51
JMU*	lb.	.23¼	.25¾
JMY*	lb.	.23¼	.23½
NDW*	lb.	.21½	.24
Pluronic L61*	lb.	**.33½**	.39
RS-968*	lb.	**.38**	**.38½**
Terpinol Prime No. 1	lb.	**.35**	**.50**
Tributyl Phosphate (dms.)	lb.	**.52½**	**.53½**
UC SAG 47*	lb.	4.85	6.25
470*	lb.	.61	1.10
VL-520*	lb.	2.68	3.50

ANTIOXIDANTS

Agebest 1293-22A*	lb.	1.90	2.00
AgeRite Alba*	lb.	2.40	2.50
Gel*	lb.	.70	.72
Hipar*	lb.	1.05	1.07
H.P.*	lb.	.79	.81
Powder*	lb.	.57	.59
Resin*	lb.	.88	.90
Resin D*	lb.	.57	.59
Spar*	lb.	.57	.59
Stalite & Stalite S*	lb.	**.57**	**.59**
Superflex*	lb.	.57	.59
Superlite*	lb.	.57	.59
White*	lb.	1.50	1.60
Akroflex C* Pellets	lb.	.85	.87
CD*	lb.	.79	.81
Aminox*	lb.	.57	.59
Antioxidant 425*	lb.	2.47	2.50
Antioxidant 2246*	lb.	1.50	1.53
Antox*	lb.	.59	.61
Aranox*	lb.	——	3.25
Benzoquinone	lb.	**1.50**	**1.75**
Betanox Special*	lb.	.94	.96
B-L-E*	lb.	.57	.59
Catalin CAO No. 1*	lb.	.57	.60
CAO No. 3*	lb.	.65	.68
CAO No. 5*	lb.	1.49	1.50
CAO No. 6*	lb.	——	3.50
Dalpac 4	lb.	.57	.60
Deenax*	lb.	.57	.60
Diphenylamine	lb.	.31	.33
Di-tert-Butyl-para-Cresol*	lb.	.86	1.16
DBPC*	lb.	.54	.60
Eugenol C-95%*	lb.	**2.30**	**2.50**
Flectol H*	lb.	.57	.64
Flexamine*	lb.	.79	.81
Ionol*	lb.	.57	.60
Naugawhite*	lb.	.57	.59
Powder*	lb.	.57	.59
Neozone A*	lb.	.64	.66
C*	lb.	.86	.88
D*	lb.	.57	.59
Nevastain A*	lb.	.51	.61
B*	lb.	.51	.70
Nullapon BF-12*	lb.	——	**.21½**
BF-13*	lb.	——	**.25½**
BF-78*	lb.	——	**.55**
BF-Acid*	lb.	——	**.85**
Octamine*	lb.	.57	.59
Oxidex*	lb.	——	**3.60**
PDA-10*	lb.	.46	.48
Pennox* A, B, C, D	lb.	.57	.72
Permalux*	lb.	——	2.25
Polygard*	lb.	.57	.59
Santoflex AW*	lb.	.71	.78
DD*	lb.	.57	.64
75*	lb.	1.01	1.08
Santovar-A*	lb.	1.55	1.62
Santowhite Crystals*	lb.	1.55	1.62
Santowhite L*	lb.	.57	.64
MK*	lb.	1.25	1.32
Powder*	lb.	1.55	1.62
Sequestrene AA*	lb.	.70	.80
NA2*	lb.	.59	.66
NA3T*	lb.	.54	.61
Sodium Nitrate	cwt.	8.75	11.00
Stabilite*	lb.	.57	.59
Alba*	lb.	.75	.80
FLX*	lb.	.78	.80
L*	lb.	.65	.67
White*	lb.	.57	.59
White Powder*	lb.	.46	.48
Stabilizer No. 1*	lb.	**1.55**	**1.80**
Stabilizer No. 9-A*	lb.	**.80**	**1.05**
Styphen I*	lb.	**.51**	**.55**
Sunolite*	lb.	.16	.22
Tecquinol*	lb.	.82½	.84½
Tannic Acid, Tech.	lb.	**.46**	**.48**
Tenamene 3*	lb.	.57	.60
Thermoflex A*	lb.	**1.05**	**1.07**
Wing-Stay S*; T*	lb.	.56	.67
Zalba*	lb.	——	1.10
Special*	lb.	——	.85

ANTIOZONANTS

Eastozone* 32*	lb.	1.15	1.18
Flexzone 3C	lb.	——	2.00
6-H	lb.	1.25	1.27
Fura-Tone NC-1008*	lb.	**.28**	**.39**
NC-1012*	lb.	**.46**	**.69**
Santoflex AW*	lb.	.71	.78
UOP 88* & 288* (dms.)	lb.	**1.05**	1.07
Wing-Stay 100*	lb.	1.00	1.08

ANTI-SCORCHING AGENTS

Akron Benzoic Acid	lb.	.41	.43
Armeen HT*	lb.	.34	.40
Good-rite Vultrol*	lb.	.67	.70
Harcopol 1183*	lb.	.70	.74
Retarder PD*	lb.	.37	.39
W*	lb.	——	.46
Sodium Acetate 60-62% Crystals	lb.	.08	.08½

ANTISEPTICS AND GERMICIDES

A.P.C. 6901*	lb.	**.32**	.38
Arquad S*	lb.	**.38**	.44
Formaldehyde (dms.)	lb.	.06	.076
G-4* (bbls.)	lb.	1.09	1.29
G-11*	lb.	1.98	2.08
Halane*	lb.	.40	.47
Irgason BS200*	lb.	2.50	2.75
Ortho Cresol (26°—27°)	lb.	.15	.16
Preventol GD	lb.	——	1.09
Retarder D*	lb.	**.42**	.50

ANTI-WEBBING AGENTS (for Latex)

DC 7 Compound*	lb.	5.05	6.50
Webnix 34-L*	lb.	**1.25**	**1.75**
57*; 69C*	lb.	1.50	2.00
71*	lb.	**1.25**	**1.75**

AROMATICS (DEODORANTS)

Airkem 115*	gal.	——	**6.50**
122*; 186*	gal.	——	6.50
Alamask AA*	lb.	——	**3.00**
AF*	lb.	——	**2.50**
AO*	lb.	——	**1.50**
AR*	lb.	——	**.50**
BG*	lb.	——	**1.15**
BGM*	lb.	——	**.60**
CY*	lb.	——	**2.40**
DJ*	lb.	——	**3.35**
DL*	lb.	——	**1.95**
H*	lb.	——	**5.50**
LD*	lb.	——	**.75**
ND*	lb.	——	**2.75**
O*	lb.	——	**6.50**
OS*	lb.	——	**5.25**
Bouquet 149*	lb.	——	**3.00**
Coumarin*	lb.	——	**3.70**
Deodorant 65*	lb.	——	**1.85**
Deodorant L-37*	lb.	**2.15**	**2.25**
L-44*	lb.	**2.65**	**2.75**
N.L.T.X.*	lb.	**1.90**	**2.00**
Deodorant Oil GD 6422*	lb.	**1.90**	**2.20**
GD 6423*	lb.	**1.60**	**1.90**
GD 6575*	lb.	**2.40**	**2.90**
GD 31063*	lb.	**2.25**	**2.75**
Ethavan*	lb.	**6.20**	**6.25**
Latex Perfume 17326	lb.	——	**4.00**
18301	lb.	——	**3.00**
22258	lb.	——	**2.50**
Naugaromes* (dms.)	lb.	**.60**	**3.00**
Neutroleum Delta*	lb.	——	**2.25**
Gamma*	lb.	——	**3.25**
Parador A*	lb.	**1.80**	**2.10**
C*	lb.	**2.00**	**2.50**
E*	lb.	**.25**	**.40**
GD 5280*	lb.	**2.00**	**2.50**
GD 53481*	lb.	**1.70**	**2.00**
Perfume Oil Bouquet Vanilla M*	lb.	**1.60**	**1.70**
Rodo No. 0*	lb.	**4.00**	**4.50**
No. 10*	lb.	**5.00**	**5.50**
Rubbarome* (dms.)	lb.	**.60**	**3.80**
Rubber Perfume 12*	lb.	——	**4.35**
Russian Leather 7*	lb.	——	**4.35**
Vanillin	lb.	**2.75**	**2.80**

BLOWING AGENTS

Ammonium Bicarbonate	cwt.	——	9.00
Better Blend Soda* (c.l., bags)	cwt.	——	2.70
B-I-K	lb.	.20	.22
Blowing Agent No. 81105*	lb.	**.32**	**.35**
Celogen*	lb.	——	**1.95**
AZ*	lb.	1.92	1.94
80	lb.	——	1.60
Diazo Amino Benzene	lb.	——	.73
Kempore R-125	lb.	——	**1.92**
Neo Fat 42-12*	lb.	**.10¼**	**.12¼**
Opex 40	lb.	——	.72
Sodium Bicarbonate, U.S.P. (c.l., bags)	cwt.	——	2.55
Unicel ND*	lb.	——	.68
S*	lb.	——	**.20**
Urea	lb.	**.06**	**.07**

BONDING AGENTS

Base 6986*	lb.	**.27**	**.32**
Braze*	gal.	**6.00**	**9.00**
Braze Cover Cement*	gal.	2.50	4.00
Chemlock 201, 203	gal.	5.00	7.50
220	gal.	8.95	12.00
401	gal.	5.00	24.00
607	gal.	18.00	24.00
614	lb.	4.35	4.75

BONDING AGENTS (Cont'd)

Durez 12987*	lb.	.47½	.49
EX-B501-4	gal.	6.20	4.90
EX-B150-1	gal.	8.15	11.00
EX-B579-1	gal.	19.40	26.40
Gen-Tac Latex*	lb.	**.70**	**.75**
Hylene M*	lb.	1.25	1.50
M-50*	lb.	.86	1.11
Penacolite B1A*	lb.	——	**.95**
R-2710*	lb.	——	**.95**
Pliobond 20*	gal.	**2.91**	**4.23**
30*	gal.	**3.65**	**4.97**
Rex Compounds*	gal.	**1.30**	**1.90**
Thixons*	gal.	2.95	9.80
Ty-Ply Q (BN & S)*	gal.	**6.75**	**8.00**
Tygobond 30*	gal.	**4.10**	**5.40**
40*	gal.	**5.80**	**6.89**
41*	gal.	**8.65**	**9.85**
45*	gal.	**5.75**	**6.48**
Vinculux	gal.	——	**4.95**

COAGULANTS

Acetic Acid—56% (bbls.)	cwt.	**9.00**	**11.00**
Glacial 99½% (dms.)	lb.	**.12**	**.13**
Calcium Nitrate, Tech. Flake	lb.	**.07½**	**.09½**
Hydroxyacetic Acid—70% (dms.)	lb.	——	**.09½**
Zinc Nitrate, Tech. Flake	lb.	——	**.20**

COLORING AGENTS

Black

Aquablak B*	lb.	**.09¾**	**.10¾**
M*	lb.	**.10½**	**.11**
S*	lb.	**.11¾**	**.12¼**
Black Shield 4*	lb.	.10	.10½
No. 6	lb.	.11	.11½
No. 17	lb.	.12½	.13
No. 19	lb.	.12	.12½
Carbon Black—See *Reinforcing Agents*			
Lampblack No. 10*	lb.	**.06**	**.09**
Mapico Black Iron Oxide* (50 lb. bags)	lb.	**.14¾**	**.15**
Pure Black Iron Oxide	lb.	.14¾	.15

Blue

Akron Masterbatches*	lb.	**2.23**	**2.78**
Toners*	lb.	**2.30**	**6.35**
Blue Powders	lb.	**2.20**	**3.75**
Cooke M.B. Blue* 426	lb.	2.20	3.75
Cyan Blue GT 55-3295	lb.	——	3.20
XR 55-3760	lb.	——	2.90
XR 55-3770	lb.	——	3.25
Disco Blues	lb.	2.20	3.45
Harmon Blue Toner B-4776	lb.	——	2.90
Monastral Rubber Blue CPL*	lb.	**1.95**	**1.95**
PCD, Dispersed*	lb.	——	**2.55**
Peacoline Blue*	lb.	——	**3.85**
Ramapo Blue*	lb.	**2.75**	**3.00**
Rubber Blue GD* (Disp.)	lb.	——	**4.75**
Rubber Blue X-1999*	lb.	——	**1.90**
Rubber Dispersed Blues	lb.	**2.52**	**2.78**
Solfast Blue*	lb.	1.60	3.25
Stan-Tone MBS*	lb.	2.20	2.92
GPE*	lb.	2.25	2.75
PEC*	lb.	1.95	2.10
Ultramarine	lb.	**.14**	**.30**
Vansul Blue M.B.*	lb.	1.00	2.70

Brown

Brown Iron Oxide	lb.	.15¾	.16
Mapico Brown* (50 lb. bags)	lb.	**.15¾**	**.16**
Stan-Tone GPE*	lb.	——	**3.00**
Vansul Brown M.B.* (Organic)	lb.	——	**2.30**

Green

Akron Masterbatches*	lb.	1.53	3.08
Toners*	lb.	1.50	4.35
Chromium Oxide	lb.	.44½	.45¼
Cooke M.B. Green*	lb.	**1.60**	**2.80**
413*	lb.	——	2.80
Cyan Green 15-3100	lb.	——	3.35
Disco Greens	lb.	1.55	**2.80**
Green Powders	lb.	**1.35**	**3.95**
Harmon Green Toner G-5056	lb.	——	3.95
Hi-Fiz Fluorescent	lb.	1.60	2.60
Monastral Rubber Green GSD* (Dispersed)	lb.	——	**2.80**
GSL*	lb.	**2.20**	**2.20**
Permansa Green CP-1236*	lb.	——	1.45
Pigment Green B*	lb.	1.45	1.50
GL-652D*	lb.	.90	.95
Ramapo Green*	lb.	——	**3.50**
Rubber Dispersed Greens	lb.	**1.23**	**3.08**
Rubber Green FD* (Disp.)	lb.	——	**2.05**
Rubber Green X-1292*	lb.	——	**1.75**
Serene Green*	lb.	——	3.50
Solfast Green*	lb.	1.60	3.35
Stan-Tone MBS*	lb.	2.50	3.42
GPE*	lb.	1.50	1.70
PC*	lb.	**2.20**	**2.25**
Vansul Green M.B.*	lb.	1.50	2.75

Maroon

Akron Masterbatches*	lb.	3.53	4.38
Toners*	lb.	.98	5.60
Harmon Maroon Toner MV-6606	lb.	——	5.75
Pyrolux Maroon*	lb.	——	**3.40**
Vansul Maroon M.B.*	lb.	——	4.05

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CONTAINS:

2365 rubber compounds on individual punched cards presorted first by polymer, then each polymer grouped into black and nonblack subgroups, further subdivided by hardness and then by tensile.

115	compounds	for natural rubber, black
154	"	for natural rubber, nonblack
276	"	for styrene rubber, black
150	"	for styrene rubber, nonblack
259	"	for nitrile rubber, black
97	"	for nitrile rubber, nonblack
254	"	for neoprene, black
116	"	for neoprene, nonblack
101	"	for butyl, black
57	"	for butyl, nonblack
50	"	for polysulfide, black and nonblack
36	"	for reclaim (all black compounds)
45	"	for Hypalon, black and nonblack
86	"	for silicone rubber, black and nonblack
92	"	for vinyls (all nonblack compounds)
100	"	for miscellaneous other rubbers, black and nonblack
156	"	for blends of general purpose rubbers (natural, styrene, butyl, reclaim), black
71	"	for blends of general purpose rubbers, nonblack
77	"	for blends containing oil-resistant rubbers, black
73	"	for blends containing oil-resistant rubbers, nonblack
2365	compounds	Total

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NAME _____

COMPANY _____

ADDRESS _____

CITY—STATE _____

COLORING AGENTS (Cont'd)

Orange

Akron Masterbatches*	lb.	2.53	2.98
Toners*	lb.	2.97	4.30
Benzidene Orange	lb.	—	3.30
Cooke MB*	lb.	2.25	2.35
425*	lb.	—	2.25
Dianisidine Orange*	lb.	—	2.85
Disco Oranges	lb.	2.30	2.85
Harmon Diane Orange Toner Y-25	lb.	—	2.85
Pyrazolone Orange Toner YB-3	lb.	—	3.30
Hi-Fiz Fluorescent	lb.	1.40	2.40
Mercadium X-2667*	lb.	—	1.65
Molybdate Orange	lb.	—	.49
Oswego Orange X2065*	lb.	—	3.30
Rubber Orange OD* (Disp.)	lb.	—	2.25
Stan-Tone Cadmium Dry*	lb.	1.85	4.28
Cadmium Paste*	lb.	2.43	2.85
GPE*	lb.	1.05	1.20
PC*	lb.	.75	.80
Vansul Orange M.B.*	lb.	2.30	2.65

Red

Akron Masterbatches*	lb.	1.30	3.68
Toners*	lb.	.98	5.60
Arcturus Reds*	lb.	—	1.35
Antimony Trisulfide	lb.	.72	.78
R.M.P. Sulfur Free*	lb.	—	.78
R.M.P. No. 3*	lb.	—	.72
Bonadur 20-6440	lb.	—	1.90
20-6540	lb.	—	2.00
Brilliant Toning Reds*	lb.	1.77	1.90
Cadmolith Red* (dms.)	lb.	1.94	2.87
Clarion 20-7150	lb.	—	1.35
Cooke M.B. Red*	lb.	1.05	3.25
410*	lb.	—	1.75
Disco Reds	lb.	1.05	3.25
Graphic Red* (dlvd.)	lb.	.98	1.03
Harmon Electra Red Toner	lb.	—	3.45
Lithol Rubine Toner R-6142	lb.	—	1.60
Pyrazolone Red Toner	lb.	—	1.40
Rincon Red Tones	lb.	—	1.90
Hi-Fiz Fluorescent	lb.	1.15	2.15
Kroma Reds*	lb.	.14¼	.14½
Lake Red C*	lb.	—	1.25
Mapico Reds* (50 lb. bags)	lb.	.14¼	.14½
Mercadium X-2668 Light*	lb.	—	1.72
X-2669 Medium Light*	lb.	—	1.80
X-2670 Medium*	lb.	—	1.87
X-2671 Dark*	lb.	—	1.95
Naphthol 20-7575	lb.	—	3.80
Oximony Red Iron Oxide	lb.	.14¼	.14½
Plasticone Red*	lb.	1.02	4.60
Polaris Red*	lb.	—	1.70
Recco Red Oxide*	lb.	.13½	.13¾
Red Iron Oxide, Light	lb.	.14¼	.14½
Red Powders	lb.	—	4.40
Rubber Dispersed Reds	lb.	1.47	3.58
Rubber Red PBD* (Disp.)	lb.	—	2.05
2BD, Dispersed*	lb.	—	2.00
2BL*	lb.	1.24	1.24
PBL*	lb.	1.24	1.24
Ruhanox Reds*	lb.	1.47	1.60
Rubber Red CP-339* (dlvd.)	lb.	—	1.10
Rubber Red X-1148*	lb.	—	.98
Solfast Red*	lb.	1.47	1.80
Stan-Tone MBS*	lb.	1.00	3.75
GPE*	lb.	.70	3.05
PC*	lb.	1.10	1.45
Vansul Red M.B.*	lb.	1.00	3.35
Watchung Red*	lb.	1.90	1.90

Tan

Mapico Tan 15* (50 lb. bags)	lb.	.23¼	.23½
20* (50 lb. bags)	lb.	.23¼	.23½

White—Lithopone

Permolith*	lb.	.0825	.09125
Sunolith*	lb.	.0800	.0875

White—Titanium Pigments

Iceberg*	lb.	—	.0265
Icecap K*	lb.	—	.03¼
Horse Head Anatase Grades*	lb.	.25½	.26½
Rutile Grades*	lb.	.27½	.28½
Stan-Tone PC*	lb.	.55	.60
Ti-Cal*	lb.	.09	.09¾
R-22*, R-25*, R-27*, R-30*	lb.	.09¾	.09¾
R-60*	lb.	.09¾	.10½
Ti-Pure*	lb.	24½	27½
Anatase Grades*	lb.	25½	26½
R-100*, R-500*	lb.	.27½	.31½
Titanox A*—all grades (dlvd.)	lb.	.25½	.26½
C-50* (dlvd.)	lb.	.14¾	.14¾
RA* (dlvd.)	lb.	.27½	.28½
RA-10* (dlvd.)	lb.	.27½	.28½
RA-NC* (dlvd.)	lb.	.27½	.28½
RC* (dlvd.)	lb.	.09¾	.10½
RC-HT* (dlvd.)	lb.	.09¾	.09¾

COLORING AGENTS (Cont'd)

White—Titanium Pigments (Cont'd)

Unitane O-110*	lb.	.25½	.26½
O-220*	lb.	.25½	.26½
O-310*	lb.	.25½	.26½
OR-150*	lb.	.27½	.28½
OR-250*	lb.	.27½	.28½
OR-340*	lb.	.27½	.28½
OR-342*	lb.	.27½	.28½
OR-350*	lb.	.27½	.28½
OR-540*	lb.	.27½	.28½
OR-640*	lb.	.27½	.28½
Zopaque*	lb.	.24½	.25½
R*	lb.	.26½	.27½

White—Zinc Oxide (American Process)

AZODOX 44, 45	lb.	.1450	.1550
AZO-ZZZ 11*, 22*, 33*, 44* 55*	lb.	.1450	.1550
Eagle-Picher AAA*	lb.	.1450	.1550
Horse Head Special*	lb.	.1450	.1550
XX*	lb.	.1450	.1550
Protox 166*	lb.	.1450	.1550
167*	lb.	.1450	.1550
267* (pelleted)	lb.	.1450	.1550
St. Joe Black Label* 20, 20-21	lb.	.1450	.1550
Red Label* 30, 31	lb.	.1450	.1550
Green Label* 12, 46 (latex only)	lb.	.1450	.1550
Green Label* 42, 42-21, 42A-3, 43 Pelets	lb.	.1450	.1550
Sherwin-Williams Oxide*	lb.	.1350	.1450

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	—	.13

White—Zinc Oxide (French Process)

AZO-ZZZ 66	lb.	.1450	.1550
Florence Green Seal*	lb.	.1625	.1725
Red Seal*	lb.	.1575	.1675
White Seal*	lb.	.1675	.1775
Kadox 25*	lb.	.1500	.1600
15*, 17*, 72* & 515	lb.	.1450	.1550
Protox 168*	lb.	.1450	.1550
169*	lb.	.1450	.1550
268* (pelleted)	lb.	.1450	.1550
U.S.P. (cartons)	lb.	.1775	.1875
XX-78*	lb.	.1450	.1550

White—Zinc Sulfide

Cryptone ZS*	lb.	.2530	.2630
Lehigh 12%*	lb.	.1250	.1350
18%*	lb.	.1400	.1500
35%*	lb.	.15375	.16375
50%*	lb.	.1575	.1675

Yellow

Akron Masterbatch*	lb.	1.27	2.48
Toners*	lb.	2.20	6.00
Benzidene-Lightfast	lb.	3.40	5.35
Benzidine Yellow	lb.	1.41	2.55
Cadmolith Yellow (dms.)	lb.	—	1.19
Chrome Yellow	lb.	.35	.35
Cooke M.B. Yellow 405*	lb.	2.15	2.75
Disco Yellows	lb.	2.05	3.95
Harmon Benzidene Yellow Toner YB-2	lb.	—	2.25
Fanchon Yellow Toner	lb.	—	2.20
Hi-Fiz Fluorescent	lb.	1.60	2.60
Iron Oxide, Pure Light Shades	lb.	.12½	.12¾
Dark Shades	lb.	.12	.12¼
Mapico Yellow* (50 lb. bags)	lb.	.12	.12¼
Rubber Dispersed Yellows	lb.	1.27	2.13
Rubber Yellow GD* (disp.)	lb.	—	2.25
GL*	lb.	—	1.68
Rubber Yelow X-1940*	lb.	—	2.25
Stan-Tone Cadmium Dry*	lb.	2.80	3.03
Cadmium Paste	lb.	1.72	1.82
MBS*	lb.	1.40	2.20
GPE*	lb.	.70	3.25
PC*	lb.	.55	3.50
Toluidine Yellow	lb.	2.20	2.20
YL-660 D*	lb.	1.25	1.35
Oximony Iron Oxide	lb.	.14¼	.14½
Vansul Yellow M.B.*	lb.	1.15	2.15
Yellow Powders	lb.	2.00	5.00
Zinc Yellow	lb.	.29	.29

DISPERSING AGENTS

Anchoid*(†)	lb.	.24	.25
Anhydrapent*	lb.	.56	.56
Armeen 18*	lb.	.39	.45
Belloid TD*	lb.	.15¾	.16¼
Blancol*	lb.	—	.15¼
Daxvan No. 1*, No. 2*, No. 3*	lb.	.22	.35
No. 6*	lb.	.15¼	.15¾
No. 7*	lb.	.18¾	.23¾
Daxad 11* (21*, 23*)	lb.	.08	.30
Diethanolamine (dms., dlvd.)	lb.	.24½	.27
Dispersaid*	lb.	1.25	1.35
Emcol K-8300* (dms.)	lb.	.14	.18
P10-59	lb.	.32	—
5120	lb.	.31	—
5138	lb.	.31	—
Emulphor ON-870*	lb.	—	.55
Furala*	lb.	.06½	.07½
Halloid*	lb.	.04½	.05½
Igepal CO-630*	lb.	—	.29
Igepon T-73*	lb.	—	.29½
Kyro EO* (dms.)	lb.	—	.29¾
Leumil SA*	lb.	—	.55

DISPERSING AGENTS (Cont'd)

Lipal No. 9-N*	lb.	.28	.29
11-O*	lb.	.28	.29
Lomar PW*	lb.	.15¼	.15¾
Marasperse C*	lb.	.06¼	.06¾
CB*	lb.	.15	.17
N*	lb.	.09½	.10½
Monoethanolamine (dms., dlvd.)	lb.	.25	.27½
Naccosol A (dlvd.)	lb.	—	.52
Naccotan A*	lb.	.16½	.17
Nekal BA-75*	lb.	—	.40
BX-78*	lb.	—	.64
Nopcosant*	lb.	.15¼	.15¾
Pluronic F68*	lb.	.38½	.44
Polyfon*	lb.	.08	.10
R & R 551*	lb.	—	.28
Stablex B*	lb.	.50	.95
Stan-Chem BQC*	lb.	.12¼	.17¼
1067*	lb.	—	.13½
1471*	lb.	.1687	.2187
2251*	lb.	.12¼	.17¼
Trenamine D-25*	lb.	.32½	.36
Triethanolamine (dms., dlvd.)	lb.	.22	.25½
Yelkin TT* (and TTS*)	lb.	.13	.16

EXTENDERS

Arco 1294-36B*	lb.	.11½	.12½
Car-Bel-Ex-A*	lb.	—	.144
Extender 600*	lb.	—	.1870
Facile Gum 4A*	lb.	.48	.50
Milex*	lb.	—	.07
W*	lb.	—	.07
Nopco 2271*	lb.	.16¾	.18¾
OPD*	lb.	.29	.40
Polyco 418*	lb.	.17	.18
PR-162 Latex Extender*	lb.	—	.182
Solvitose HDF*	lb.	.22	.25
Synprolac*	lb.	.16	.23
Synprowax*	lb.	—	.23
Vanadiset B*	lb.	.0360	.07
C*	lb.	.0310	.06
MR* 80 mesh	lb.	.08½	.12½
Vistanex MM Grades*	lb.	—	.35
Wilcarbo Carbon Powders*	lb.	.08	.15

FILLERS (Inert and Reinforcing)

Abrasives			
Carbonite*	lb.	.21½	1.35
Lionite*	lb.	.16	1.27
Pumice	lb.	.03	.05
Walnut Shell Grits	ton	60.00	110.00
Aluminum Hydrate	lb.	.031	.170
Kaiser Aluminum Hydrate*	lb.	.035	.065
Aluminum Silicate			
AFD*	ton	29.50	36.00
Aluminum Flake*	ton	29.50	36.00
Marter White*	ton	18.50	30.00
Barium Carbonate (l.c.l.)	ton	109.00	126.50
Barytes			
No. 1 Floated, White*	ton	55.00	79.85
No. 2 Floated, Unbleached*	ton	50.00	74.85
No. 22 Barytes* (c.l.)	ton	—	30.00
No. 2805 Barytes*	ton	22.00	26.75
Foam A*	ton	—	55.00
Sparmite*	ton	80.00	90.00
X10R*	ton	90.00	95.00
Bentonite (c.l.)	ton	—	13.50
Argosite Clay* (c.l.)	ton	—	12.50
Bennett Clay* (c.l.)	ton	—	32.50
SPV Volclay* (c.l.)	ton	—	13.50
White Hi-Gel*	ton	—	65.90
Blanc Fixe	ton	125.00	142.00
Calcium Carbonate			
Allied Whiting	ton	—	11.50
Atomite* (c.l.)	ton	32.50	35.00
B.I. White No. 1 (c.l.	ton	—	10.00
Calcene NC*	ton	80.00	100.00
TM*	ton	82.50	102.50
Calwhite*	ton	20.00	25.00
T*	ton	25.00	30.00
Camel-Carb*	ton	—	14.00
Camel-Tex*	ton	—	22.00
Camel-Wite*	ton	—	35.00
Carbium	ton	30.00	40.00
CCO White*	ton	—	22.00
Duramite*	ton	20.00	22.00
Gamaco* (c.l.)	ton	32.50	37.50
T*	ton	37.50	42.50
Gama Kal*	ton	37.50	42.50
Georgia Marble 5-25* (c.l.)	ton	—	20.00
No. 10 White* (c.l.)	ton	—	11.00
Kalite*	ton	52.50	67.50
Kalmac*	ton	23.00	28.00
Laminar*	ton	—	30.00
Lexamite* (c.l.)	ton	—	27.50
Lorite*	ton	30.00	36.00
Millical*	ton	38.00	53.00
Multifex MM*	ton	117.50	137.50
Non-Fer-Al*	ton	35.00	50.00
Purecal M*	ton	56.75	80.75
SC* (and T*)	ton	110.00	125.00
U*	ton	120.00	135.00
PPTD* (c.l.)	ton	—	30.00
Rambo No. 1*	ton	—	11.50
Snowflake*	ton	20.00	22.00
Super Multifex*	ton	167.50	187.50
Surfex*	ton	42.00	57.00
Suspenso*	ton	38.00	43.00
Witcarb Reg.*	ton	60.00	85.00
R*	ton	127.50	150.00
RC*	ton	117.50	140.00
York White*	ton	—	11.50

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Features:

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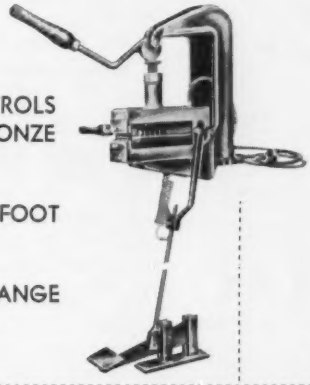
★ HAND OR FOOT OPERATED

★ QUICK CHANGE OF MOLDS



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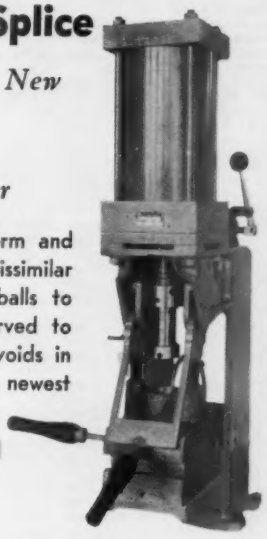
Injection Molding Splicer



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FILLERS (Cont'd)

Calcium Silicate			
Silene EF*	lb.	.06	.06½
Calcium Sulfate, Anhydrous			
Snow White Filler*	ton	——	22.00
Calcium Sulfate Hydrous			
Terra Alba No. 1*	ton	——	17.00
Chalk Whiting (l.c.l.)	lb.	.01½	.01¾
Recco Paris Whiting*	ton	——	35.00
OMYA Whiting*	ton	——	35.00
Clay			
Afton Clay*	ton	13.00	38.00
Aiken Clay*	ton	14.50	——
Akron HC-100*	ton	14.50	——
HC-75*	ton	13.00	——
SC-25*	ton	14.50	——
Alsilite* (c.l.)	ton	30.00	45.00
Aluminum Flake*	ton	25.50	28.50
Borden R*	ton	13.00	18.00
Buca* (c.l.)	ton	——	45.00
Burgess No. 20*	ton	——	33.00
No. 30*	ton	——	40.00
Burgess Iceberg*	ton	——	53.00
Icecap K*	ton	——	65.00
Catalpo* (c.l.)	ton	33.00	——
Champion*	ton	——	14.50
Crown*	ton	——	14.50
Dixie* (c.l.)	ton	——	14.50
Dover*	ton	——	13.00
Franklin Clay—R* (c.l.)	ton	16.00	41.50
G. K. Soft*	ton	11.50	32.00
Glomax HE (bags)	lb.	65.00	——
LL (bags)	lb.	53.00	——
PVR (bags)	lb.	40.00	——
WZ (bags)	lb.	45.00	——
Harwick Clays*	ton	21.50	77.00
Hydrite RS (bags)	lb.	30.00	——
PXS (bags)	lb.	45.00	——
UF (bags)	lb.	100.00	——
10S (bags)	lb.	50.00	——
Flat "D" (bags)	lb.	25.00	——
Hi-White R*	ton	14.50	——
Kaolloid Clay* (c.l.)	ton	——	10.50
LGB*	ton	17.50	22.50
LGP*	ton	20.00	25.00
McNamee* (c.l.)	ton	——	14.50
Natka 1200	ton	13.00	36.00
Par* (c.l.)	ton	——	12.00
Paragon*	ton	14.50	19.50
Pigment 5*	ton	27.50	31.50
33*	ton	——	40.00
Polyfil 40	ton	40.00	——
70	ton	53.00	——
80	ton	65.00	——
C	ton	65.00	30.00
F	ton	45.00	50.00
X	ton	33.00	38.00
Recco* (c.l.)	ton	——	14.50
Swanee Clay*	ton	——	12.50
Snobrite*	ton	——	12.50
Suprex*	ton	14.50	19.50
Whitetex* (c.l.)	ton	53.00	——
Windsor*	ton	14.50	39.50
4200 Clay*	ton	13.00	——
Diatomaceous Earth	ton	30.00	50.00
Celatom MN-33	ton	36.00	95.00
MP-25	ton	55.00	121.00
MP-63	ton	55.00	121.00
Celite 270	ton	55.00	121.00
292	ton	36.00	95.00
315; 350	ton	137.00	225.00
Kaylorite* (c.l.)	ton	——	30.00
Lorite*	ton	——	36.00
Flock			
Cotton (White)	lb.	.28	.30
Colored	lb.	.12	.20
Filfloc F 40-9000*	lb.	——	.13
F 6000*	lb.	——	.36
Nylon	lb.	——	.35
Polycel*	ton	110.00	210.00
Rayon, Bleached or Dyed	lb.	.75	1.20
Rayon, Grey	lb.	——	.11
Rayon, Pink	lb.	——	.21
Solka-Floc* (l.c.l.)	lb.	.07	.16
Glue, Amber	lb.	.17	.19
Ground Softwood Bark			
Silvacon* (c.l.)	ton	55.00	100.00
Leather			
Flour (dust)	lb.	.12	.13
Shredded	lb.	.05	.17
Lignin	lb.	.06	.08
Limestone, Pulverized	ton	3.00	5.00
Asbestol Regular*	ton	28.00	——
Asbestol Superfine*	ton	33.00	——
Georgia Marble No. 10*	ton	——	11.00
Industrial Filler No. 100*	ton	——	7.75
Micro Velva A*	ton	53.00	——
L*	ton	61.00	——
No. 1 White*	ton	——	11.00
Magnesium Carbonate	lb.	.10½	.15
K & M Technical*			
(c.l., eqld.)	lb.	.10½	.12
Marinco CL*	lb.	.11	.15
Michigan*	lb.	.11	.12
Magnesium Silicate (see Talc)			
Mica	lb.	.01¼	.07½
Concord*	lb.	.08	.08¾
Micro-Mica*	lb.	.08	.08¾
Mineralite* (c.l.)	ton	40.00	85.00
Silversheen*	lb.	.08	.08¾
Triple A Mica* (c.l.)	ton	——	40.00
Vermiculite*	lb.	——	.11
Wet Ground Biotite			
Mica	lb.	.06½	.07¼
Wet Ground Mica No. 160*	lb.	.08	.08¾

FILLERS (Cont'd)

Pecan Shell Flour			
Stan Shell*	ton	45.00	75.00
Pyrophyllite			
No. 261*	ton	——	11.50
Pyrax A* (c.l.)	ton	14.50	15.00
WA* (c.l.)	ton	17.00	17.50
Sawdust, Graded	ton	14.00	35.00
Silica	ton	16.00	27.00
Extra Fine (bags)			
(c.l.)	ton	——	43.00
Slate, Powdered (l.c.l.)	ton	15.00	20.00
Lo-Micron Slate Flour*	lb.	——	.04½
No. 133 Slate Flour*	ton	——	4.55
Sodium Silico Aluminate			
Zeolex 23*	lb.	.06	.07
Talc (Magnesium Silicate)			
Akron Soapstone*	ton	——	9.75
Asbestol Regular*	ton	——	27.00
Eastern RC-500*	ton	——	32.00
No. 41*	ton	——	19.70
No. 549*	ton	——	63.00
French*	ton	——	59.00
No. 367*	ton	——	13.00
No. 1600*	ton	——	70.60
No. 1768*	ton	——	13.00
Nytal 200* (c.l.)	ton	——	28.00
300* (c.l.)	ton	——	38.00
Sierra Fibrene C-400*	ton	34.00	40.00
Sierra Supreme 325*	ton	51.00	56.00
Sierra White*	ton	21.75	26.75
Soapstone*	ton	——	13.00
Walnut Shell Flour	ton	55.00	100.00
Agrashell*	ton	55.00	115.00
Stan-Shell*	ton	50.00	110.00
Whiting, Commercial	ton	——	7.50
Allied Whiting*	ton	——	11.50
Camel-Carb*	ton	——	10.00
Calwhite (c.l.)	ton	——	20.00
C-C-O White*	ton	——	22.00
Georgia Marble No. 15*	ton	——	20.00
No. 10*	ton	——	20.00
Piqua No. 1 YAA* (c.l.)	ton	10.00	10.00
No. 2 LS* (c.l.)	ton	10.00	10.00
Snowflake* (c.l.)	ton	20.00	22.00
Stan-White 325*	ton	11.50	14.10
Ultrasil*	lb.	.35	.50
Veroc* (c.l.)	ton	——	11.50
Welco* (c.l.)	ton	——	10.50
York White R* (c.l.)	ton	——	11.00
Wood Flour	ton	31.50	48.00

FINISHING MATERIALS, SURFACE

Beaco Finishes*	gal.	2.10	2.35
Black Out*	gal.	4.50	8.00
Calcium Hypochlorite			
(dms.) (cwt.)	ton	33.30	37.90
Shellac, Orange Gum	lb.	.35	.45
VanWax*	gal.	2.00	2.05

FLAME RETARDANTS

Celluflex CEF* (dms.)	lb.	——	.65
Chlorowax 40*	lb.	.15	.17½
0*	lb.	.16	.18½
70*	lb.	.18½	.20
Halowax*	lb.	.36	.46
Zinc Borate 3167*	lb.	.1920	.2020
Pyrox Compounds*	lb.	.38	.95½

LATEX MODIFIERS

Crux*	lb.	.30	.65
Foamnix*	lb.	.60	1.50
Ludox	lb.	.15	.16¾
Nopco EB*	lb.	.16¾	.18¾
EB-1*	lb.	.16¾	.18¾
EB-5*	lb.	.19½	.21½
OPD-101*	lb.	.29	.40
Piccopale A-1 Emulsion	lb.	.086	.113
A-20	lb.	.089	.116
A-22	lb.	.097	.124
A-41; A-43	lb.	.0775	.0145
C-1	lb.	.091	.118
N-3	lb.	.100	.127
STAYB*	lb.	.25	.45
Syton 200	lb.	.15	.16¼
Ubatol U-2001* (t.c.)	lb.	.166	.187
U-2003* (t.c.)	lb.	.184	.208
U-2007* (t.c.)	lb.	.166	.187
U-3025* (c.l.)	lb.	.223	.235
U-3040* (c.l.)	lb.	.260	.272
U-3045* (c.l.)	lb.	.260	.272
U-3050* (c.l.)	lb.	.195	.207
Webnix*	lb.	1.25	2.00

LUBRICANTS, MOLD

Akro Gel*	lb.	——	.165
Alipal CO-433*	lb.	——	.20
CO-436*	lb.	——	.24
Aluminum Stearate Crown			
Brand*	lb.	.37	.42
Amine, Mixed Crude*	lb.	.19	.25
Aquadag*	lb.	3.50	4.00
Aquarex D*	lb.	——	.81
E*	lb.	——	.94
ME*	lb.	——	.82
MDL*	lb.	——	.33
WAQ*	lb.	——	.22
Armeen HT*	lb.	.34	.40
180*	lb.	.52	.56
Armid HT (flaked)*	lb.	.42	.46
0*	lb.	.39	.41
Borax, Granular (l.c.l.)	ton	89.00	94.00

LUBRICANTS, MOLD (Cont'd)

Carbowax 4000*	lb.	.31	.32
CD Mold Release B*	gal.	5.00	——
B-2*	gal.	5.00	——
Colite Concentrate* (dms.)	gal.	.90	1.15
Colite D43D*	gal.	1.15	1.40
Concentrex*	lb.	——	.25
Dag Dispersion No. 197*	lb.	1.95	2.90
D.C. 7 Compound*	lb.	5.05	6.50
D.C. Emulsion No. 7*	lb.	1.59	2.07
No. 8*	lb.	1.20	1.74
No. 35*; 35A*	lb.	1.20	1.74
No. 35B*	lb.	1.20	1.74
No. 36*	lb.	1.20	1.74
D.C. Mold Release Fluid*	lb.	3.04	3.61
Dri-Lube*	lb.	——	.22
Dryflo* (bags)	lb.	21.40	21.55
Emulsion Lubricant A80*	lb.	——	1.20
45*	lb.	——	1.20
G-E Silicone Emulsion			
SM-55*	lb.	1.15	1.69
SM-61*	lb.	1.15	1.69
SM-62*	lb.	1.15	1.69
G-E Silicone Fluid SF-92*	lb.	2.90	4.05
SF-96*	lb.	2.90	4.05
Hawkeye Flake* (dlvd.)	lb.	.11½	.13¼
Igepal CO-430*	lb.	——	.29
CO-630*	lb.	——	.29
CO-530*	lb.	——	.29
Igepon AP-78*	lb.	——	.48
T-33*	lb.	——	.21
T-51*	lb.	——	.13½
Kokobace R*	lb.	.17½	.18½
Lipal 9-N*	lb.	.28	.29
7-O*	lb.	.29	.30
Lubrex	lb.	.25	.30
Lubri-Flo*	gal.	10.00	12.00
Migralube*	lb.	——	.35
ML-1027-2C*	gal.	——	2.65
ML-1028-2C*	gal.	——	2.65
Mold Lubricant No. 72			
Conc.* (dms.)	gal.	——	1.90
Mold Lubricant No. 426*			
(dms.)	lb.	.18	.17
No. 735* (dms)	gal.	——	1.25
No. 769* (dms.)	gal.	——	1.20
No. 825* (dms.)	gal.	——	2.00
No. 856* (dms.)	gal.	——	1.90
No. 880* (dms.)	gal.	——	1.19
No. 887* (dms.)	gal.	——	1.80
No. 935* (dms.)	gal.	——	1.56
No. 956* (dms.)	gal.	——	2.50
No. 965* (dms.)	gal.	——	2.15
No. 967* (dms.)	gal.	——	2.40
No. 969* (dms.)	gal.	——	1.50
No. 970* (dms.)	gal.	——	4.50
No. 975* (dms.)	gal.	——	2.85
No. 980* (dms.)	gal.	——	1.53
No. 987* (dms.)	gal.	——	2.45
A 187* (dms.)	gal.	——	1.90
A 256* (dms.)	gal.	——	1.20
A 988* (dms.)	gal.	——	2.60
Moldeze No. 3*	gal.	——	4.95
Mold-Brite*	gal.	——	1.50
Monopole Oil MD*	lb.	——	.16
MR-22 Silicone Semi-			
Permanent	gal.	9.95	14.95
Olate Flakes*	lb.	.23½	.24¾
Orvus WA Paste* (dms.)	lb.	——	.23¼
Plaskon Polyethylene S*	lb.	.32	.47
Poly-Brite PE-20	lb.	.28	.42
600	lb.	.42	.58
Poly-Cone 125X	lb.	1.15	1.30
1,000	lb.	.91	1.04
Polyglycol 15-200*	lb.	.25	.28¾
E4000*	lb.	.31	.37
Prodag*	lb.	.32	.60
Purity Flake* (dlvd.)	lb.	.14¾	.16½
Rubber-Flo*	gal.	1.25	2.00
Rubber-Glo*	gal.	——	.94
Rusco Mold Paste*	lb.	.25½	.32
Sericite* (l.c.l.)	ton	65.00	75.00
Silicone Oil A145*	lb.	3.22	3.61
A220* (dms.)	lb.	——	2.80
Silrex (dms.)	lb.	——	.65
Rubars*	lb.	——	.22¾
Soybean Lecithin	lb.	.13	.17
Thermalube*	lb.	——	.13¾
UC Silicone L-45*	lb.	2.90	4.61
L-522*	lb.	2.68	3.50
LE-45*	lb.	1.15	1.69
LE-450*	lb.	1.15	1.69
Ucon Lubricants*	lb.	.26¾	.27¾
Ulco Mold Soap*	lb.	.19	.29

LUBRICANTS, RUBBER

Cyclolube NN-1; NN-2;			
NN-3	gal.	.12½	.20½
NN-4	gal.	.13½	.21½
114	gal.	.19	.27
4053	gal.	.21	.29
Diglycol Stearate Neutral			
(and SE) (dms.)	lb.	——	.25
Extrud-o-Lube*	gal.	1.33	1.54
Ivory Chips*	lb.	.19¾	.20¾
LatexLube GR* (dlvd)	lb.	.19¼	.21½
No. 82-A* (450 lb. dms.)	lb.	——	.08¾
Nopcowax 22-DS*	lb.	.38½	.41
Propylene Stearate (dms.)	lb.	.35	.60
Versa-Lube B*	lb.	.16	.18

LUBRICANTS, RUBBER SURFACE

Antidust	lb.	.37	.41
Barium Stearate	lb.	.41	.46
Calcium Stearate	lb.	.39	.44
Crown Brand*	lb.	.37	.42
D.C. 7 Compound*	lb.	5.05	6.50
D.C. 200 Fluid*	lb.	3.04	3.61
ELA*	lb.	—	.82
G-E Silicone Fluid SF-92*	lb.	3.04	4.25
Glycerized Lubricant*	gal.	1.25	1.48
Glydag B*	lb.	1.60	2.25
Glyso-Lube* (dms.)	lb.	—	.14
No. 3* (dms.)	lb.	—	.14
Hydro-Zinc*	lb.	—	.20
Latex-Lube Pigmented* (dlvd.)	lb.	.17¼	.19¼
R-66*	lb.	—	.17¼
Liqui-Lube* (dlvd.)	lb.	—	.17¾
N.F.* (dlvd.)	lb.	—	.17¾
N.T.* (dlvd.)	lb.	—	.18¾
Lubrex*	lb.	.27	.32
Lubri-Cote	gal.	.80	1.00
Magnesium Stearate	lb.	.42	.47
Crown Brand*	lb.	.40	.45
Polyethylene Glycol	lb.	.22	.26
Rexanol*	lb.	—	.13
Rubber Free (Concentrate)*	gal.	—	1.44
Jel*	lb.	.18	.21½
Separex*	lb.	.08½	.10½
Slab-Dip* (dms.)	lb.	—	.17
Soybean Lecithin	lb.	.13	.17
Stock-Lube*	lb.	—	.19
UC L-45*	lb.	2.90	4.61
L-522*	lb.	2.68	3.50
LE-450*	lb.	1.15	1.69
XL-42*	lb.	3.10	4.75
XLE-42*	lb.	1.22	1.70
XLE-420*	lb.	1.18	1.70
Wet Zinc*	lb.	—	.22¼
CW*, P*	lb.	—	.20
Zinc Stearate	lb.	.41	.46

MOLD CLEANERS

Actusol* (dlvd.)	gal.	1.45	1.65
Alkon* (dlvd.)	lb.	.16	.16½
CA-301*	gal.	—	2.49
CA-302*	gal.	—	2.63
G-O 6910*	lb.	.38	.40
Metso Anhydrous*	cwt.	5.70	7.95
Metso 99*	cwt.	5.00	7.25
200*	cwt.	6.70	8.95
Granular*	cwt.	4.45	6.70
Orvus Extra Granules*	lb.	.23¼	.24¼
Polo*	lb.	.12¾	—
Rubber-Sol*	gal.	2.97	3.97
Shelblast*	lb.	.04	.08½
Sprex A.C.* (dlvd.)	lb.	.17¾	.18¾
Zip Mold Cleaner*	gal.	1.05	1.55

PEPTIZING AGENTS

Peptizer P-12*	lb.	.95	1.25
Pepton 22 Plasticizer*	lb.	.83	.86
65*	lb.	1.23	1.26
65B*	lb.	.83	.86
Pitt-Consol 640 (dms.)	lb.	—	.42
RPA 2*	lb.	—	.85
3*	lb.	—	.51
3 Conc.*	lb.	—	.85
6*	lb.	—	1.66

PLASTICIZERS & SOFTENERS

Acto 500*	lb.	—	.09
Adipol BCA*	lb.	.47	.47½
2EH*	lb.	.42½	.43½
10A*	lb.	.42½	.43½
ODY*	lb.	.45½	.46½
810*	lb.	.42½	.45½
XX*	lb.	.42½	.43½
Admex 562 (dms.)	lb.	.50¾	.51¼
710 (dms.)	lb.	.35¾	.36¼
711 (dms.)	lb.	.37¾	.38¼
744 & 745 (dms.)	lb.	.41¾	.42¼
760 (dms.)	lb.	.59¾	.60¼
761 (dms.)	lb.	.46¾	.47¼
770 (dms.)	lb.	.42¼	.43
Anhydrol 6990*	lb.	.51	.56
Arneel SD*	lb.	.34	.40
Arolene 1980* (e.l.)	lb.	—	.10
Aromatic Plasticizer 10* (and 25*) (dms.)	lb.	.08	.08½
Aromatic Tar	gal.	.0573	.1973
Bardol*	lb.	.02¼	.03¼
B*	lb.	.06¼	.06½
Bayol D*	gal.	—	.382
F*	gal.	—	.52
Bearflex 1751*	lb.	.14	.15
LPO*	lb.	.03	.04
MPO*	lb.	.03¼	.04¾
Beeswax, Bleached	lb.	73	.75
Yellow Refined	lb.	.64	.65
Bondogen*	lb.	.55½	.60½
B.R.C. No. 20*	lb.	.0150	.0175
No. 21*	lb.	.02¼	.03
No. 22*	lb.	.02½	.02¾
B.R.H. 2*	lb.	.0213	.0351
BRS 700*	lb.	.0200	.0285

PLASTICIZERS & SOFTENERS (Cont'd)

B.A.T. 3*	lb.	.0180	.0265
4*	lb.	.0250	.0260
7*	lb.	.0300	.0310
B.K.V.*	lb.	.0475	.0565
Bunarex Resins*	lb.	.07	.08
Bunatak AH*	lb.	—	.09½
N*	lb.	—	.31
U*	lb.	—	.17½
No. 90*	lb.	—	.09
No. 210*	lb.	—	.14
Butac*	lb.	.1635	.1735
Butyl Carbitol Periargonate (dms.)	lb.	—	.04½
Butyl Cellosolve Periargonate (dms.)	lb.	—	.08
Butyl Oleate	lb.	.26	.27
Butyl Palmitate	lb.	—	.20½
Butyl Stearate (dms.)	lb.	.26	.27¾
Byerflux*	gal.	.24	.2[illegible]
Califlux 510* (and 550*)	lb.	.02¾	.03¾
G.P.*	lb.	.01½	.02½
R-100*	lb.	.04¾	.05¼
LBL*	gal.	.17	.25
OSR*	lb.	.01⅞	—
RC*	gal.	.13½	.21½
TT*	lb.	.0195	.0295
Candelilla Wax, Prime	lb.	.53	.64
Refined Light	lb.	.56	.60
Carbowax 4000* (dms.)	lb.	.68	.70
Cardolite NC-103*	lb.	.36	.59
Carnauba Wax, Crude	lb.	.73	.74
Flaked	lb.	.73	1.25
Refined, Technical	lb.	.73	.74
Refined, Pure	lb.	.82	.86
Yellow	lb.	1.10	1.15
Celluflex* (dms.)			
112* (t.c., dlvd.)	lb.	—	.32½
179-A* (t.c., dlvd.)	lb.	—	.32½
179-C* (t.c., dlvd.)	lb.	—	.32½
179-EG* (t.c., dlvd.)	lb.	—	.32½
DBP* (t.c., dlvd.)	lb.	—	.30
DOP* (t.c., dlvd.)	lb.	—	.28½
TPP* (dms., eqld.)	lb.	—	.40
Ceresin Wax	lb.	.12	.30
Chlorowax 40*	lb.	.15	.17½
50*	lb.	.16	.18½
70*	lb.	.18½	.20
LV*	lb.	.17	.19½
CTLA Polymer*	gal.	.20	.36
Cumar Resins*	lb.	.07	.19
Cyclolube OSR*	gal.	.28	.36
Darex DBM*	lb.	.30½	.34
DBP*	lb.	.30	.33½
DOP*	lb.	.30½	.33½
DIOP*	lb.	.30½	.33½
D.B.M.*	lb.	.32	.34¾
Decylbutyl Phthalate	lb.	.27	.29½
Degras, Common	lb.	—	.14
Diallyl Phthalate	lb.	.51½	.52½
Dibenzyl Sebacate (dms.)	lb.	.93	.93½
Dibutoxyethyl Sebacate	lb.	—	.61½
Dibutyl Phthalate (dms.)	lb.	.28½	.30
Dibutyl Sebacate	lb.	.67½	.68
Dicapryl Adipate (dms.)	lb.	.41½	.42½
Dicapryl Phthalate (dms.)	lb.	.27½	.29
Dicapryl Sebacate	lb.	.58	.59½
Di-Carbitol Phthalate (dms.)	lb.	.49	.49½
Dicyclohexyl Phthalate	lb.	.45	.46½
Diethyl Phthalate (dms.)	lb.	.27½	.29
Di-2-ethylhexyl Phthalate (dms.)	lb.	.27½	.29
Dihexyl Adipate (dms.)	lb.	.46½	.47½
Dihexyl Phthalate (dms.)	lb.	.32½	.33½
Dihexyl Sebacate (dms.)	lb.	.66	.66½
Diisobutyl Azelate	lb.	—	.47¾
Diisobutyl Phthalate	lb.	.28	.29½
Di-iso-octyl Adipate	lb.	.42½	.43½
Dimethyl Phthalate (dms.)	lb.	.27½	.29
Dimethyl Phthalate	lb.	.27½	.29
Dimethyl Sebacate (dms.)	lb.	1.30	1.30½
Dinonyl Adipate	lb.	.44½	.47½
Dinopol IDO*	lb.	.28	.29½
MOP*	lb.	.29	.30½
Dioctyl Adipate (dms.)	lb.	.42½	.43½
Dioctyl Phthalate (dms.)	lb.	.27½	.29
Dioctyl Sebacate (dms.)	lb.	.61¼	.62¼
D.I.O.P. (dms.)	lb.	.27½	.29
Dipolymer Oil	gal.	.33	.48
Dispersing Oil No. 10*	lb.	.06	.06¼
Dutrex* 1, 6, 7	gal.	.18	.23
6H	gal.	.13	—
15E	gal.	.11	.23
20, 25	lb.	.03	.06
33	gal.	.21	.33
Elastex 10-P*	lb.	.30½	.33½
50-B*	lb.	.25	.28
DCHP*	lb.	.59	.60
Emulphor EL-719*	lb.	—	.58
Epoxy Plasticizer	lb.	.33½	.36
Drapex 3.2*	lb.	.39¼	.40¼
Drapex 4.4*	lb.	.34¾	.35¾
Drapex 7.7*	lb.	.37	.38
Esparto Wax	lb.	—	.55
Estac*	lb.	—	.16
Facile Gum 4A*	lb.	.48	.50
Flexol B-400*	lb.	.29	.30
DOP*	lb.	.29	.30½
TOF*	lb.	.47	.48
3GH*	lb.	—	.46¾
3GO*	lb.	—	.55¾
4GO*	lb.	—	.36½
426*	lb.	.28½	.30
Flexricin P-1*	lb.	.33½	.36½
P-4*	lb.	.30½	.33¼
P-6*	lb.	.37	.40
P-8*	lb.	.30¼	.33¼

PLASTICIZERS & SOFTENERS (Cont'd)

Fortex A* (dms.)	lb.	.12½	.14½
Fura-Tone NC-1008*	lb.	.28	.39
Galex W-100*	lb.	.15½	.19¾
Good-rite GP233*	lb.	.40	.43½
GP235*	lb.	.40	.43½
GP236*	lb.	.40	.43½
GP261*	lb.	.28	.31½
GP265*	lb.	.28½	.32
GP266*	lb.	.29	.32½
GP-266-BPA*	lb.	.29	.32½
Hallco C-255-NS*	gal.	.27½	.29½
C-566*	lb.	.11	.13
Harflex 300* (dms.)	lb.	.60½	.61
325* (dms.)	lb.	.45	.45½
375* (dms.)	lb.	.76	.76½
500* (dms.)	lb.	.34	.35
HB20*	lb.	.17	.18½
HB40*	lb.	.21½	.23
Herron-H.T.*	gal.	.16	.27
Herron-Plas*	lb.	—	.03¾
Herron Wax*	lb.	.05¼	.06
No. 23*	lb.	.08¼	.08¾
No. 24*	lb.	.07⅛	.07¾
HSC No. 13*	lb.	.25	.32
No. 39*	lb.	.22	.29
Indonex 632½*, (633½*, 634½*, 637½*)	gal.	.12	.19
Isooctyl Decyl Phthalate (dms.)	lb.	.28	.29½
Kapsol*	lb.	.35	.35½
Kenflex A & N*	lb.	.19	.34
Kesscoflex BCL* (dms.)	lb.	—	.37
BCO* (dms.)	lb.	—	.33
BCP* (dms.)	lb.	—	.36
BCS* (dms.)	lb.	—	.32
BO* (dms.)	lb.	—	.28¼
BS* (dms.)	lb.	—	.27½
DBT* (dms.)	lb.	—	.68
DIOA* (dms.)	lb.	—	.43½
DOA* (dms.)	lb.	—	.43½
MCO* (dms.)	lb.	—	.35½
MCP* (dms.)	lb.	—	.41
MCS* (dms.)	lb.	—	.35
TRA* (dms.)	lb	—	.40
KP 23*	lb.	.32½	.33½
90*	lb.	.42½	.43½
140*	lb.	.48	.48½
201*	lb.	.45	.46½
260*	lb.	.36½	.37½
Kremol 40*	gal.	.36	.46
50*	gal.	.39	.49
Kromisol* (dms.)	lb.	.36½	.37½
Kronitex AA* (dms.)	lb.	.35	.36
I, K-3, MX*	lb.	.35	.36
Lanolin, Tech. Anhydrous	lb.	—	.26
Latex-Lube G.R.*	lb.	.19¼	.20
Lead Oleate	lb.	—	.29¾
Lindol* (dms., t.c.)	lb.	—	.32½
Locusol No. 1-6980*	lb.	.30	.34
2-Mercaptoethanol (dms.)	lb.	1.25	1.50
Methox*	lb.	.39½	.40
Methyl Laurate	lb.	.25	.27
Methyl Oleate	lb.	—	.20
Methyl Stearate (dms.)	lb.	—	.30
Monoplex DOS*	lb.	.59½	.60½
DBS*	lb.	.65½	.66½
S-70*	lb.	.41	.42
S-71*	lb.	.46½	.47½
Montan Wax, Crude	lb.	.21	.26
Flaked	lb.	.29	.29
Morflex*	lb.	.32	.69½
Natac*	lb.	.1585	.1685
Nebony Resins* (dms.)	lb.	.04½	.05½
Neolene 210* (t.c.)	lb.	—	.16
212* (t.c.)	lb.	—	.14
220* (t.c.)	lb.	—	.15
Nerium*	lb.	—	.09
Nevillac Resins* (dms.)	lb.	.31	.85
Neville LX-880* (dms.)	lb.	.12	.13½
LX-685* (dms.)	lb.	.12	.17½
LX-782 (dms.)	lb.	.07½	.08½
LX-828* (dms.)	lb.	.11	.12½
LX-1000* (dms.)	lb.	.12	.13
Neville Resins* (dms.)	lb.	.07¼	.20
Nevindene Resins* (dms.)	lb.	.16½	.20
Nevinol* (dms.)	lb.	—	.24
No. 480 Oil Proof Resin*	lb.	—	.18
Ohopex Q10* (dms.)	lb.	.29	.30½
R9* (dms.)	lb.	.37¼	.37¾
OPD*	lb.	.29	.40
Ortho-Nitrobiphenyl	lb.	.13	.15
Ozokerite Wax, White and Yellow	lb.	.24	.31
Paradene Resins (dms.)	lb.	.07¼	.08
No. 2 Flaked	lb.	.08	.08½
Para Flux* (dms.)	gal.	.22	.25
2016* (dms.)	gal.	.22	.26
Para Lube* (t.c.l.)	lb.	.046	.048
Paraplex G-25*	lb.	.76	.77
G-40*	lb.	.50	.51
G-50*	lb.	.40¼	.41¼
G-53*	lb.	.45	.46
G-60* (and G-61*)	lb.	.32¼	.32¼
G-62*	lb.	.33¼	.33¾
Parmo*	lb.	.06	.13½
Peroxidol 780*	lb.	.33¼	.36¼
781*	lb.	.34¾	.37¾
Petroflux MV*	gal.	.097	.177
Petrolatum (dms.)	lb.	.04¼	.14½

PLASTICIZERS & SOFTENERS (Cont'd)

PG-16*	lb.	—	.35
Philrich-5* (t.c.)	gal.	—	.12½
Picco 10* (and 25*)	lb.	.15	.15½
60* (and 75*)	lb.	.14½	.15
100*	lb.	.14½	.17
Piccocizer 30*	lb.	.06½	.07
Piccolastic A* (B*, C*, D* & E*)	lb.	.24	.25
FT* (FHX* & FX*)	lb.	.1695	.1745
T-135*	lb.	.19	.20
Piccolyte S Resins*	lb.	.20½	.23½
Piccopale Resins*	lb.	.12	.13
Piccoumaron Resins*	lb.	.07	.18
Pigmentar* Pigmentaroil*	lb.	.510	.684
Pitt-Consol 500* (dms.)	lb.	.30	.30½
Plastac M*	lb.	—	.09¼
Plasticizer 2286*	lb.	—	.26¼
Plasticizer 4141*	lb.	.42½	.43½
Plasticizer DP-200, DP-250, DP-520*	lb.	.45	.45¾
DP-316*	lb.	.32¾	.33½
DP-317*	lb.	.46	.47¼
DP-8732*	lb.	.44¾	.46
Plasticizer LP*	lb.	—	.07
Plasticizer MP*	lb.	—	.08
Plasticizer MT-511*	lb.	—	.69¼
Plasticizer OLN*	lb.	.36	.42
Plasticizer SC*	lb.	.42	.46
Plasticizer W-13*	lb.	.37	.38¾
Plastoflex 3*	lb.	—	.52
52*	lb.	.37¾	.3o¾
VS*	lb.	.41¾	.42¾
Plastogen*	lb.	.08¾	.09
Plastolein 9050* (c.l.)	lb.	.54½	.56½
9055*	lb.	.30½	.32½
9058*	lb.	.48	.50
9250*	lb.	.38¼	.40¼
9715*	lb.	.39	.40
Plastone	lb.	.23	.27
Polycizer 162*	lb.	.27½	.29
332*	lb.	.42½	.44
562*	lb.	.28	.29½
662*	lb.	.28½	.30
532 and 632*	lb.	.42½	.44
ED*	lb.	—	.45
Polyco 438*	lb.	.34	.35
Polymel C-130*	lb.	.13¾	.14¾
D*	lb.	.22½	.23½
6*	lb.	.05¾	.07¾
Poly-Sperse AP-2	lb.	.23	.29½
AP-300, LC-20	lb.	.26	.32½
Poly-Sperse R-100	lb.	.17	.23½
Process Oil C-255* (c.l.)	gal.	.27½	.29½
Propylene Stearate (dms.)	lb.	—	.32
PRR 1*	gal.	.15	.35
PT 101 Pine Tar Oil* (t.c., dms.)	lb.	.0380	.0554
400 Pine Tar* (600* & 800*) (t.c., dms.)	lb.	.0380	.0554
PX-104* (dms.)	lb.	.29	.30½
PX-108* (dms.)	lb.	.27½	.29
PX-138* (dms.)	lb.	.27½	.29
PX208* & 238* (dms.)	lb.	.42½	.43½
PX-404* (dms.)	lb.	.67½	.68½
PX-438* (dms.)	lb.	.61¼	.62¼
PX-800* (dms.)	lb.	.35¼	.36¼
PX-917* (dms.)	lb.	.35	.36
RC Plasticizer B-17* (dms.)	lb.	.23½	.24½
O-16* (dms.)	lb.	.30	.31
TG-8*&TG-9* (dms.)	lb.	.34½	.35½
TG-85* (dms.)	lb.	.36½	.37½
RC Polymeric BGA* (dms.)	lb.	.45½	.46½
Reogen*	lb.	.14¼	.14½
Resin C*	lb.	.0225	.0310
731D	lb.	.17¼	.18½
Resinex*	lb.	.03¾	.05½
L-4*	lb.	.02¼	.04¼
Rexflex*	lb.	—	.15
Rosin Oil	gal.	.80	1.35
RR-10 (Neoprene)*	lb.	—	.37
R.S.O. Softening Oil*	lb.	.03	.05
RuBars*	lb.	.19¼	.20
Rubberol*	lb.	.18	.25¼
Santicizer B-16*	lb.	.46¾	.47¾
E-15*	lb.	.53	.54
M-17*	lb.	.44	.45
No. 140*	lb.	.35	.36
No. 141*	lb.	.36½	.37½
No. 160*	lb.	.27½	.29
No. 602*	lb.	—	.28½
No. 603*	lb.	.27	—
Sherolatum*	lb.	.03½	.06
Staflex DBES*	lb.	.58½	.61½
DOS*	lb.	.59¼	.62¼
IXA*	lb.	.32	.35
KA*	lb.	.34	.36¾
Stan Chlor Oils*	lb.	.13½	.20½
70*	lb.	.17½	.30
Stanolind Petrolatum*	lb.	.07	.156
Wax*	lb.	.31	.33
Staybelite Resin	lb.	.13¾	.15
Sunny South Burgundy Pitch*	lb.	.123	.1285
Rosin Oil*	gal.	.605	.76
Superla Wax*	lb.	.30	.397
Syncera Wax*	lb.	.16	.267
Syn Tac* (c.l.)	gal.	—	.33
Synthetic Revertant Oil	lb.	—	.16
Tar, Refined	gal.	.1200	.1760
Tarpine	lb.	.035	.050
Terpene A*	gal.	—	.65
Tetraflex R-122*	lb.	.27	.30½
TP-90B*	lb.	.59	.69
TP-95*	lb.	.65	.75

PLASTICIZERS & SOFTENERS (Cont'd)

Transphalt Resins*	lb.	.03¾	.05¾
Tributyl Phosphate	lb.	.52½	.53½
Tricresyl Phosphate	lb.	.35	.36
Triphenyl Phosphate	lb.	.41½	.43½
Turgum S*	lb.	.1460	.1560
Turgum SB*	lb.	.09½	.10½
Turpol NC-1200*	lb.	.67	.70
NC-1300*	lb.	—	.50
Vistac No. 1*	gal.	1.00	1.21
P*	lb.	.18	.18½
Vopcolene 50*	lb.	—	.31
Witcizer 100*	lb.	.26	.27
200*	lb.	.22¼	.25¼
300*	lb.	.30	.33½
312*, 313*	lb.	.28	.31½
412*	lb.	.42½	.46

PROCESSING AIDS

Castor Oil, Blown (dms)	lb.	.25½	.26½
Refined (dms.)	lb.	—	.18½
Castorwax*	lb.	.25	.31
Dutrex 7*	lb.	.12	.20
ELA*	lb.	—	.82
Foamnix*	lb.	.60	1.50
Hydrofol Glycerides 200*	lb.	.15½	.19¾
Kenflex N*	lb.	.19	.26
Maleic Anhydride	lb.	—	.27
Millrex*	lb.	—	.15
Nadic Anhydride	lb.	—	.75
Polycin*	lb.	—	.24½
R-B-H Resin 510*	lb.	.19	.26
530*	lb.	.25	.32
STAYB*	lb.	.25	.45
Thiomalic Acid	lb.	—	3.50
Webmix*	lb.	1.25	2.00
Zyrox*	lb.	.78	.88

PROTECTIVE & STABILIZING AGENTS

Acacia*	lb.	.12¾	.21
Alcogum*	lb.	.08½	.24
Alpha Protein	lb.	—	.23
Aroostoocrat*	lb.	—	.07½
Carob Bean Flour	lb.	—	.50
Casein	lb.	.22	.35
Emcol K-8300* (dms.)	lb.	.14	.18
Ethylene Diamine 68%	lb.	.44	.47
Gum Arabic	lb.	—	.23
Karaya Gum	lb.	—	.35
Locust Bean Gum	lb.	—	.50
Modicol VD*	lb.	.13½	.15⅞
Prosern*	lb.	—	.06
Stablex B*	lb.	.50	.95
K*	lb.	.27	.35

RECLAIMING AGENTS

Amalgamator Z-4*	lb.	.34	.35
Armeen C*	lb.	.46	.52
Mixed Crude*	lb.	.19	.25
T*	lb.	.32	.38
Blend No. 27 Oil	gal.	.35	.42
Burco RA*	lb.	.05	.081
BWH-1*	gal.	.16	.17
C-6 Oil* (28* & 32*)	gal.	.33	.38
C-10 Oil*	gal.	.25	.30
C-33* (t.c.)	gal.	—	.21½
C-42* (t.c.)	gal.	—	.23
Caustic Soda—Flake 76% (c.l., dms.)	cwt.	—	5.20
Liquid 50% (t.c.)	cwt.	—	2.90
Solid 76% (c.l., dms.)	cwt.	—	4.80
Cresylic Acid (99-100%)	gal.	.85	1.39
D-4* (t.c.)	gal.	—	.27
E-5* (t.c.)	gal.	—	.25
Flake Calcium Chloride (77-80%)	ton	—	31.00
(94-97%)	ton	—	39.80
Gensol No. 6* (t.c.)	gal.	—	.42
Heavy Aromatic Naphtha	gal.	.13¼	.18½
LX-572 Reclaiming Oil*	gal.	.27	.32
LX-777 Reclaiming Oil*	gal.	.23	.33
Neo-Fat D-242*	lb.	.05½	.07¾
42-70*	lb.	.08¼	.10¼
No. 517 H.B. Oil*	gal.	.11½	.16½
535*	gal.	.22	.27
Nucom* (t.c.)	gal.	—	.42
Pitt-Consol 500 (dms.)	lb.	.30	.30½
640 (dms.)	lb.	.42	.42
PT 101 Pine Tar Oil* (t.c., dms.)	lb.	.0380	.0554
Q Oil* (t.c.)	gal.	—	.286
Reclaiming Oil 3186-G*	gal.	.26	.33
Reclaiming Reagent No. 1431*	lb.	.21	.25
R.P.A. No. 3*	lb.	—	.51
RR-10*	lb.	—	.37
Soda Ash (c.l., bags)	cwt.	—	1.85
Solvenol No. 1	gal.	.50	.67
No. 2	gal.	.41	.62
Solvent 534*	gal.	.20½	.26½
Solvent Oil 21*	gal.	.24	.29
C-42*	gal.	.23	.38
701 Oil*	gal.	.27	.29

REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Dixiedensed (and S)*	lb.	.0775	.1550
Kosmobile (and S)*	lb.	.0775	.1550

REINFORCING AGENTS—CARBON BLACK (Cont'd)

Channel, Medium Processing (MPC) (bags)

Arrow MPC*	lb.	.0850	.1625
Continental A*	lb.	.0850	.1625
Dixiedensed HR (and S-66)	lb.	.0850	.1625
Kosmobile HM (and S-66)	lb.	.0850	.1625
Micronex Standard*	lb.	.0850	.1625
Spheron 6*	lb.	.0850	.1625
Texas M*	lb.	.0850	.1625
Witco No. 1*	lb.	.0850	.1625

Channel, Easy Processing (EPC) (bags)

Collocarb*	lb.	.0710	.1485
Continental AA*	lb.	.0850	.1625
Dixiedensed 77*	lb.	.0850	.1625
Kosmobile 77*	lb.	.0850	.1625
Micronex W-6*	lb.	.0850	.1625
Spheron 9*	lb.	.0850	.1625
Texas E*	lb.	.0850	.1625
Witco No. 12*	lb.	.0850	.1625
Wyex EPC*	lb.	.0850	.1625

Channel, Conductive (CC) (bags)

Continental R-40*	lb.	.2600	.3500
Dixie 5 Dustless*	lb.	.1350	.2200
Dixie Voltex*	lb.	.2600	.3500
Kosmink Dustless*	lb.	.1350	.2200
Kosmos Voltex	lb.	.2600	.3500
Texas MC-74-BD*	lb.	.2600	.3500
Voltex*	lb.	.2600	.3500

Conductive Furnace Black (CF) (bags)

Aromex CF*	lb.	.0875	.1550
Continex CF*	lb.	.1100	.1700
Dixie CF*	lb.	.0925	.1600
Kosmos CF*	lb.	.0925	.1600
Shawinigan Acetylene Black*	lb.	—	.1900
Vulcan C*	lb.	.1100	.1850

Extra-Conductive Furnace Black (ECF) (bags)

Vulcan XC-72 (pellets)*	lb.	.2500	.3400

Furnace, Fast Extruding (FEF) (bags)

Arovel FEF*	lb.	.0675	.1350
Continex FEF*	lb.	.0675	.1350
Dixie 50*	lb.	.0675	.1350
Kosmos 50*	lb.	.0675	.1350
Philblack A*	lb.	.0675	.1350
Statex M*	lb.	.0675	.1350
Sterling SO*	lb.	.0675	.1350

Furnace, Fine (FF) (bags)

Statex B*	lb.	.0725	.1400
Sterling 99*	lb.	.0725	.1400

Furnace, General Purpose (GPF) (bags)

Arogen GPF*	lb.	.0600	.1275
Continex GPF*	lb.	.0600	.1275
Dixie 35*	lb.	.0600	.1275
Kosmos 35*	lb.	.0600	.1275
Statex G*	lb.	.0600	.1275
Sterling V*	lb.	.0600	.1275
V (Non-Staining)	lb.	.0600	.1275

Furnace, High Abrasion (HAF) (bags)

Aromex HAF*	lb.	.0775	.1450
Continex HAF*	lb.	.0775	.1450
Dixie 60*	lb.	.0775	.1450
Kosmos 60*	lb.	.0775	.1450
Philblack O*	lb.	.0775	.1450
Statex R*	lb.	.0775	.1450
Vulcan 3*	lb.	.0775	.1450

Furnace, High Modulus (HMF) (bags)

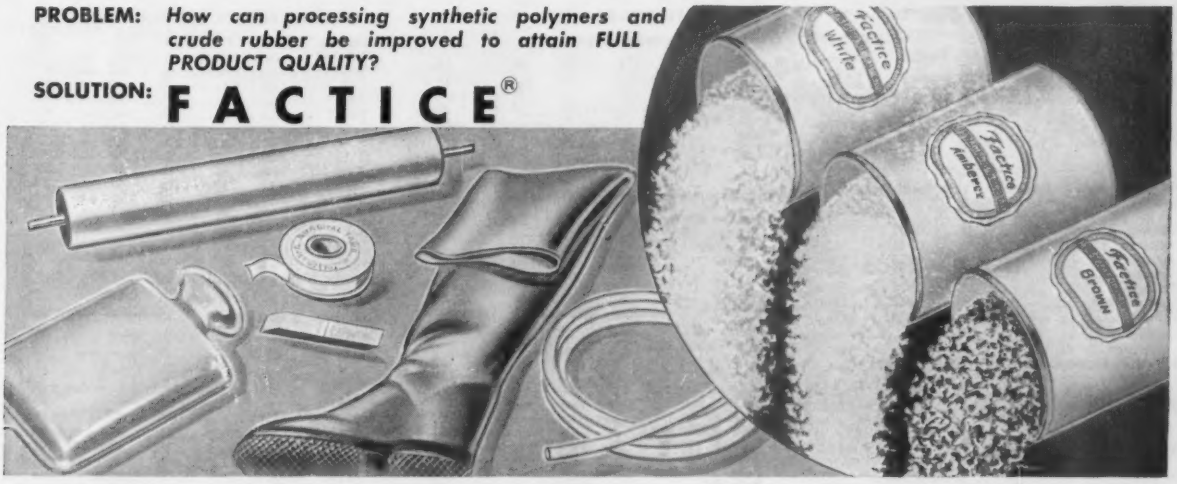
Continex HMF*	lb.	.0625	.1300
Dixie 40*	lb.	.0625	.1300
Kosmos 40*	lb.	.0625	.1300
Modulex HMF*	lb.	.0625	.1300
Statex 93*	lb.	.0625	.1300
Sterling L* and LL*	lb.	.0625	.1300

Furnace, Semi-Reinforcing (SRF) (bags)

Continex SRF*	lb.	.0575	.1250
Dixie 20*	lb.	.0575	.1250
Essex SRF*	lb.	.0575	.1250
Furnex*	lb.	.0575	.1250
Gastex*	lb.	.0625	.1350
Kosmos 20*	lb.	.0575	.1250
Pelletex* and NS*	lb.	.0575	.1250
Regal*	lb.	.0575	.1250
Shawinigan Acetylene Black*	lb.	—	.1900
Sterling NS* and S*	lb.	.0575	.1250
R*	lb.	.0625	.1350

PROBLEM: *How can processing synthetic polymers and crude rubber be improved to attain FULL PRODUCT QUALITY?*

SOLUTION: **FACTICE®**



FACTICE®. . . ***highest quality vulcanized vegetable oils have solved many of these problems . . .***

LET US HELP YOU IN SELECTING THE TYPE FOR YOUR NEEDS

Factice
THE STAMFORD RUBBER SUPPLY CO.
Vulcanized Oil

NOTE THESE OUTSTANDING QUALITIES: Rapid incorporation rate. Facilitates pigment dispersion. Prevents the sagging of extruded goods and stock contraction previous to cure. Dries out sticky compounds and prevents their adhering to mill and calender rolls. Improves low temperature flexibility. Prevents sweating where stocks are heavy in processing oils. Good aging qualities. Compatible with neoprene, crude, and SBR. FACTICE is supplied in white, amber and brown.

Feel free to submit your problems to us. Data on request any time.

The STAMFORD RUBBER SUPPLY CO.
Stamford, Conn.

This NEW 3" x 8" THROPP MILL *expedites* rubber and plastics research

Aided by many years of experience in designing laboratory mills, Thropp engineers have developed this up-to-date 3" x 8" model. It sets new standards for attractive modern design, compactness and economical maintenance.

The new mill, designed for processing small batches, is one of the Thropp family of rubber and plastics mills, ranging in size up to 84". The machine has tilting type guides to facilitate thorough and rapid cleaning and prevent carry-over of color or other contamination to subsequent batches.

Manufacturers who appreciate the importance of fast, accurate, economical research and development work will find this machine a sound investment. Send for further information.

Wm. R. THROPP & Sons
Division of J. M. LEHMANN COMPANY, Inc., 555 NEW YORK AVE., LYNDHURST, N. J.

REINFORCING AGENTS—CARBON BLACK (Cont'd)

Furnace Super Abrasion (SAF) (bags)

Dixie 85	lb.	.1150	.1750
Kosmos 85	lb.	.1150	.1750
Philblack E*	lb.	.1150	.1900
Statex 160*	lb.	.1150	.1900
Vulcan 9*	lb.	.1150	.1900

Furnace, Super Abrasion, Intermediate (ISAF) (bags)

Aromex ISAF*	lb.	.0925	.1600
Continex ISAF*	lb.	.0925	.1600
Dixie 70*	lb.	.0925	.1600
Kosmos 70*	lb.	.0925	.1600
Philblack I*	lb.	.0925	.1600
Statex 125*	lb.	.0925	.1600
Vulcan 6*	lb.	.0925	.1600

Furnace, Super Conductive (SCF) (bags)

Conductex SC*	lb.	.1150	.1800
Vulcan SC*	lb.	.1800	.2550

Thermal, Fine (FT) (bags)

P-33 (c.l.)*	lb.	——	.0625
Sterling FT (c.l.)	lb.	——	.0625

Thermal, Medium (MT) (bags)

Shellblack*(†)	lb.	——	.0250
Sterling MT (c.l.)	lb.	——	.0450
MT Non-Staining (c.l.)*	lb.	——	.0550
Thermax (c.l.)*	lb.	——	.0450
Stainless (c.l.)	lb.	——	.0550

Specialty Blacks (Awaiting Classification)

Regal 300*	lb.	.0775	.1450
Regal 600*	lb.	.0925	.1600

REINFORCING AGENTS—SILICA

Cab-o-sil*	lb.	.66	1.25
D. C. Silica (pelletized)*	lb.	1.45	1.65
Hi-Sil 233*	lb.	.08¾	.09¾
X303*	lb.	.50	.60
Santocel*	lb.	.62	.64
Ultrasil VN-3*	lb.	.35	.65
Valron Estersil*	lb.	2.00	2.25

REINFORCING AGENTS—MISCELLANEOUS

Angelo Shellac*	lb.	.40	.50
Cato* (bags)	lb.	17.00	17.15
Darex Copolymer No. 3*	lb.	.47	.49
43G*	lb.	.39	.41
Darex Copolymer Latex No. 3-L	lb.	.41½	.46
Durez 12687 (and 12707)*	lb.	.36½	.40
Durez 13355*	lb.	.27½	.31½
Dymerex Resin	lb.	.15¾	.17
Good-rite Resin 2007*	lb.	.36	.38
2057*	lb.	.30	.31
Hystron*	lb.	.39	.41
Kralac A-EP*	lb.	.39	.41
Lampblack	lb.	——	.12
Marbon 8000*	lb.	.36	.43
Marmix*	lb.	.35	.43
Mistron Vapor*	lb.	——	.03½
HGO-55*	lb.	——	.05
Pliolite Latex 150*	lb.	.35	.39
Pliolite Resin-Rubber Masterbatches*	lb.	.33	.57
Pliolite NR*	lb.	.93	.95
S6B*	lb.	.36	.43
Plio-Tuf G85C*	lb.	.52	.54
Polyco 220*	lb.	.18¼	.19¼
Poly-Phen 201-C; 218-C	lb.	.27½	.29
202-C	lb.	.36	.37½
Polypol S-70*	lb.	.25	.26

RETARDERS

Akron Benzoic Acid TBAO-2*	lb.	.41	.43
Dutch Boy Normasal*	lb.	——	.46
ESEN*	lb.	.39	.41
Good-rite Vultrol*	lb.	.67	.70
Harcopol 1183*	lb.	.70	.74
Retarder J*	lb.	.68	.70
PD*	lb.	.39	.41
W*	lb.	——	.46
Retardex*	lb.	.46	.46
Wiltrol P	lb.	.37	.39

RUBBER SUBSTITUTES

Mineral Rubber

Byerlyte*	ton	55.00	62.00
Herd Hydrocarbon (dms.)*	ton	53.00	60.00
Herron Flake*	ton	——	45.00
Mineral Rubber, Solid	ton	42.50	44.50
M. R. No. 38*	ton	57.00	70.00

RUBBER SUBSTITUTES (Cont'd)

Vulcanized Vegetable Oils

Amberex*	lb.	.29	.36
Brown	lb.	.15	.24
Car-Bel-Lite*	lb.	.33½	.36
Neophax*	lb.	.17	.27
Car-Bel-Rex A and C*	lb.	——	.126
White	lb.	.15	.26
670 Brown	lb.	.14¼	.14¾

Miscellaneous Rubber Substitutes

Gilsowax B*	lb.	.09	.11
Resin No. 1098 (dms.)	lb.	——	.62
No. 1198*	lb.	.46¾	.49¾
Tysonite*	lb.	.26	.26¾

SOLVENTS

Acetone (dlvd.)	lb.	.11	.12½
Amsco Lactol Spirits* (t.c.)	gal.	——	.20
Naphthol Spirits*	gal.	——	.19
Mineral Spirits*	gal.	——	.18
Rubber Solvent* (t.c.)	gal.	——	.19
Solv A* (t.c.)	gal.	——	.22
Solv A-80* (t.c.)	gal.	——	.23½
Solv B* (t.c)	gal.	——	.28
Solv B-90* (t.c.)	gal.	——	.31
Solv D* (t.c.)	gal.	——	.30
Solv E*	gal.	——	.30
Solv F*	gal.	——	.30
Solv F-80*	gal.	——	.32
Solv G*	gal.	——	.36
Special Naphtholite* (t.c.)	gal.	——	.19
Special Textile Spirits*	gal.	——	.20
Super Hi-Flash Naphtha*	gal.	——	.34
Super Naphtholite*	gal.	——	.19
Textile Spirits* (t.c.)	gal.	——	.20
Amyl Chlorides, Mixed (l.c.l.) (dms.)	lb.	——	.11
Bensol 90%	gal.	.36	.40
Butyl Acetate	lb.	.17	.18½
Butyl Alcohol	lb.	.17	.19½
Secondary (dlvd.)	lb.	.15	.16½
Tertiary (dlvd.)	lb.	.15	.16½
Carbon Bisulfide, Tech.	lb.	.07	.08½
Carbon Tetrachloride	lb.	.10¾	.14¼
Cesol 1*	gal.	.37	.43
2*	gal.	.42	.48
Cyclohexane	gal.	.77	.110.00
85% (c.l.) (dms.)	gal.	——	.56
Cyclohexanone	lb.	.31	.34½
Diacetone, Pure (dlvd.)	lb.	.15½	.17
Dichlorethyl Ether (dms.)	lb.	.15½	.16½
Dichloropentanes (l.c.l.) (dms.)	lb.	——	.06
Dicom*	gal.	——	.55
Halowax Oil*	lb.	.28	.41
Heptanes* (t.c.)	gal.	——	.1609
Hexanes (t.c.)	gal.	——	.1584
Isobutyl Acetate	lb.	.15¼	.16¾
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.62	.72
Ether, Ref. (dlvd.)	lb.	.09½	.11
Merasol*	gal.	.43	.79
Mesityl Oxide (dlvd.)	lb.	.15	.16½
Methyl Acetone, Syn. (dms., dlvd.)	gal.	.66	.72
Methyl Chloride	lb.	——	.12½
Methyl Ethyl Ketone	lb.	.15	.16½
Methyl Isobutyl Ketone (dlvd.)	lb.	.17	.18½
Methylene Chloride	lb.	——	.12½
N-5 Pentane Mix* (t.c.)	gal.	——	.13½
N-6 Hexanes* (t.c.)	gal.	——	.14½
N-7 Hexanes* (t.c.)	gal.	——	.13½
Nelio Dipentene	gal.	.41	.62
Penetrell*	gal.	.41	.42
Perchlorethylene	lb.	.11¾	.15½
Petrolene* (t.c.)	gal.	——	.14125
Picolines, Alpha, Refined	lb.	.43½	.44
Mixed	lb.	.32½	.33
Proprietary Solvent (dms.)	gal.	.66	.77
Propyl Acetate (t.c., dlvd.)	lb.	——	.11¾
Alcohol (t.c., dlvd.)	lb.	——	.11
Pyridine, Refined	lb.	.69½	.70
Quinoline	lb.	.50¾	.51¼
Rubber Solvent (t.c.)	gal.	——	.16
Rubsol (t.c.)	gal.	——	.12875
Skellysolve B (Hexanes)* (t.c.)	gal.	——	.16
C (Heptanes)* (t.c.)	gal.	——	.16¼
R (Rubber Solvent)*	gal.	——	.1390
Solvent, Crude, Light	gal.	.19	.28
Solvesso 100* (t.c.)	gal.	.33	.35
150 (t.c.)	gal.	.33	——
Sunny South DD Dipentene*	gal.	.41	.62
Sunny South DD Pine Oil*	lb.	——	.15
Sunray*	gal.	.1140	.1600
Toluene (dms.)	gal.	——	.38
Toluol (t.c.)	gal.	.25	.25
Trichlorethane	lb.	——	.12¾
Trichlorethylene	lb.	.12	.16¾
Triglycol Dichloride	lb.	.63	.64
Union Thinner 1* (t.c.)	gal.	——	.174
5* (dms.)	gal.	——	.199
7* (t.c.)	gal.	——	.164
2-50 W Hi-Flash*	gal.	——	.41
Xylol (t.c.)	gal.	.29	.30

STABILIZING AGENTS (for Vinyl Resins)

Advastab BC-12*	lb.	.90	.95
BC-74*	lb.	.70	.75
BC-105*	lb.	.75	.80
CH-101*; CH-201*	lb.	.60	.65
E-82*	lb.	90	.95
JCX*	lb.	.62	.67
L Paste*	lb.	.65	.70
SN*	lb.	.47	.52
T-10*	lb.	1.90	1.95
T-50-LT*	lb.	3.20	3.25
XBZ-155*	lb.	.69	.74
XC-143*	lb.	.90	.95
XE-98*	lb.	.53	.58
Amioca 50* 85* (bags)	lb.	11.11	11.26
Barca 10*	lb.	.65	.70
Barium Stearate	lb.	.41	.46
Basic Silicate White Lead	lb.	.16½	.17½
Cadmium Ricinoleate	lb.	——	2.00
Calcium Ricinoleate	lb.	——	.55
Dutch Boy DS-207*	lb.	——	.54
B*	lb.	——	.32½
Tribase*	lb.	——	.27½
Dythal*	lb.	——	.39½
Ferro 182* (dms.)	lb.	.70	.76
200* (dms.)	lb.	1.33	1.43
203* (dms.)	lb.	.87	.91
541* (dms.)	lb.	.35½	.45½
541A* (dms.)	lb.	.82	.86
700* (dms.)	lb.	.48¾	.58¾
900* (dms.)	lb.	.90	.94
903* (dms.)	lb.	.60	.64
909* (dms.)	lb.	.91	.95
920*	lb.	——	.98
931* (dms.)	lb.	.75¾	.85¾
993* (dms.)	lb.	.89	.99
1203* (dms.)	lb.	1.30	1.40
1206* (dms.)	lb.	1.32	1.36
1820* (dms.)	lb.	.90	.94
1825* (dms.)	lb.	1.00	1.04
1976*	lb.	.47	.51
Harshaw 1-V-3*	lb.	.43	.45
1-V-4*	lb.	.68	.70
1-V-7*	lb.	.70	.72
2-V-4*	lb.	.85	.87
2-V-8*	lb.	1.31	1.33
5-V-1*	lb.	.41	.43
Harshaw 7-V-2*	lb.	.93	.95
8-V-1*	lb.	.82	.84
8-V-100*	lb.	.82	.84
9-V-1*	lb.	.70	.72
12-V-5*	lb.	.73	.75
24-V-1*	lb.	1.10	1.12
128-V-5*	lb.	.86	.88
Istabelan No. 115 Liquid	lb.	.85	.95
No. 120 Liquid	lb.	.65	.75
Kosol* (bags)	lb.	19.00	19.50
Lithium Stearate	lb.	.52	.57
Fluffy	lb.	.47½	.70
Standard	lb.	.52½	.75
Mark A*	lb.	2.80	3.15
C*	lb.	.81	.84
E*	lb.	.72	.75
GS*	lb.	.77	.80
LL*	lb.	.59	.62
KCB*	lb.	.59	.62
M*	lb.	.59	.62
PL*	lb.	.62	.65
TT*	lb.	.72	.75
WS*	lb.	.97	1.00
X*	lb.	2.50	2.75
XI*	lb.	.87	.90
XV*	lb.	.84	.87
XX*	lb.	.57	.60
33*; 34*; 35*	lb.	.97	1.00
Metasap 613-A*	lb.	——	.69
613-B*	lb.	——	.84
613-C*	lb.	——	1.06
621*	lb.	——	.88
624*	lb.	——	.75
633*	lb.	——	.75
635*	lb.	——	.45
Modicol N*	lb.	.42½	.44½
S*	lb.	.30⅞	.32⅞
Nonisol 100	lb.	.38	.43
Sodium Silicates 41°/1:3.2	cwt.	1.20	2.30
Stabilizer No. 52*	lb.	1.90	2.00
89X*	lb.	.75	.80
B-5*	lb.	——	.70
E6B*	lb.	——	.95
G-1*	lb.	1.25	1.40
HR*	lb.	.85	.89
L*	lb.	——	.60
OM-10*	lb.	——	1.95
Staflex OY*	lb.	1.00	1.20
QXMA*	lb.	——	.70
Stayrite 10*	lb.	.36	.41
P-10*	lb.	.43	.45
15*	lb.	.55	.57
20*	lb.	.41	.46
22*	lb.	1.00	1.13
25*	lb.	.35	.40
70*	lb.	.70	.72
71*	lb.	.90	.92
75*	lb.	.61	.63
76*	lb.	.53	.55
80*; 90*	lb.	.70	.72
95*	lb.	.70	.72
229*	lb.	.61	.63

STABILIZING AGENTS (Cont'd)

Vanstay A* (dms.)	lb.	.50	.53
AB* (dms.)	lb.	.46	.49
AC* (dms.)	lb.	.45	.48
CE* (dms.)	lb.	.44	.47
HT* (dms.)	lb.	.87	.90
HTA* (dms.)	lb.	.97	1.00
HTB* (dms.)	lb.	.70	.73
HTC* (dms.)	lb.	1.09	1.12
HTE* (dms.)	lb.	.80	.83
L* (dms.)	lb.	.32	.35
R* (dms.)	lb.	.67	.70
RR* (dms.)	lb.	.59	.62
RZ-25* (dms.)	lb.	.65	.69
S* (dms.)	lb.	.57	.60
SA* (dms.)	lb.	.81	.84
W* (dms.)	lb.	1.22	1.25
Z* (dms.)	lb.	.62	.65

STIFFENING AGENTS

Polyac*	lb.	—	1.85
Processinfi Stiffener 710*	lb.	.88	.90
Solvitose HDF, H. C-S, T, and E*	lb.	.22	.25
Versatil Gum 8-E*	lb.	.15	.19

SUN CHECKING AGENTS

Allied AA-1144*	lb.	.23	.24
AA-1177*	lb.	.15½	.16½
Antisol*	lb.	—	.23
Antisun* (Chipped)	lb.	.15½	.17½
(Slabbed)	lb.	.15	.17
Heliozone*	lb.	.31	.32
Microflake*	lb.	.20	.24
Nacconol NRSF*	lb.	.40½	.45
NBC*	lb.	—	1.67
Ross Sunproofing Waxes*	lb	—	.15
Sunolite*	lb.	.16	.22
127*	lb.	.16½	.20½
154*	lb.	.23	.25
Sunproof*	lb.	.32	.33
Improved*	lb.	.25	.26
Super*	lb.	.41	.42
Jr.*	lb.	.22	.23
Tonox*	lb.	.54	.56

SURFACE ACTIVE AGENTS

Anhydrapent*	lb.	.56	.59
Anhydrol 6990*	lb.	.51	.56
6991*	lb.	.51	.56
Aquarex D*	lb.	—	.81
G*	lb.	—	.21
MDL*	lb.	—	.33
ME*	lb.	—	.82
NS*	lb.	—	.60
SMO*	lb.	—	.50
WAQ*	lb.	—	.22
Emulphor EL-620*	lb.	—	.40
EL-719*	lb.	—	.58
ON-870*	lb.	—	.55
Hyonics*	lb.	—	.28¾
Igepal CA-630	lb.	—	.29
CO-630; CO-730*	lb.	—	.29
CO-850; CO-880*	lb.	—	.29
Igepon CN-42*	lb.	—	.25
T-33*	lb.	—	.21
T-51*	lb.	—	.13½
T-77*	lb.	—	.49
Kessco 50201*	lb.	—	.44½
50203*	lb.	—	.44¼
18201*	lb.	—	.32
18203*	lb.	—	.35½
Lipal 9-N.* 11-0*	lb.	.28	.29
8-0,* 6-0*	lb.	.29	.30
25C,* 52C*	lb.	.34	.35
15T*	lb.	.23	.24
Nacconol NR (dlvd.)	lb.	.14½	.16
NRSF (dlvd.)	lb.	.40½	.45
Pluronic L62*	lb.	.33½	.39
L64*	lb.	.33½	.39
Sellogen Gel*	lb.	—	.12¾
Soybean Lecithin	lb.	.13	.17
Synatol AV-60*	lb.	.28	.29

TACKIFIERS

Amalgamator Z-4*	lb.	.34	.35
Arceo 620-32B*	lb.	.20½	.21½
716-30*	lb.	.18½	.19½
1041-21*	lb.	.16½	.17½
Arceo A-2t*	lb.	.18	.19
Bunaweld Polymer No. 780*	lb.	—	.24
Galex* (dms.)	lb.	.17¼	.20
Indopol H-300*	gal.	1.00	1.22
Koresin*	lb.	1.13	1.15
Liquid Rubber Flux*	lb.	—	.14
Nacconol NRSF* (dlvd.)	lb.	.40½	.45
Nilox Resin* (c.l.)	cwt.	—	16.00
Nopco 2271*	lb.	.16¾	.18¾
OPD*	lb.	.29	.40
PR-162 Resin Emulsion	lb.	.82	—
Resin V	lb.	—	.23½
Synthol*	lb.	.17	.24¾
Vistac A*	lb.	.21½	.22¾
Vistanex LM Grades*	lb.	—	.45
Zirex* (c.l.)	cwt.	—	15.25
82 Resin Solid (dms.)	lb.	.13½	.14½
84 Resin Solid (dms.)	lb.	.13½	.14½

THICKENERS (For Latex)

Alcogum AN-6*	lb.	.06	.06½
AN-10*	lb.	.09	.10
AN-25*	lb.	—	.31
PA-15*	lb.	.13½	.17½

THICKENERS (Cont'd)

Alcogum PA-15-B*	lb.	.13½	.17½
Betanol* (dms.)	lb.	.70	.95
CM Starch* (bags)	lb.	26.85	27.00
Gomme Labolene*	lb.	.45	.47
Good-rite K-702*	lb.	.28½	.37
K-704*	lb.	.21	.22
K-705*	lb.	.30	.39
K-707*	lb.	.18	.19
K-708*	lb.	.28	.37
K-710*	lb.	.15	.16
Hycryl A-1000* (t.l.)	lb.	.090	.100
A-2000* (t.l.)	lb.	.335	.360
Hydroseal 3* (bags)	lb.	9.19	9.34
Melojel* (bags)	lb.	6.71	6.86
Modicol VD*	lb.	.13⅜	.15⅞
VE*	lb.	.13⅞	.16⅜
Polyco 296 BT*	lb.	.15	.16
29n-N*; 530*	lb.	.15	.16
Propylene Laurate (dms.)	lb.	.57	.82
Sodium Silicate, 41°/1:3.2	cwt.	1.20	2.30
Solvitose Series*	lb.	.22	.25

VULCANIZING AGENTS

Peroxide

Di-cup	lb.	1.10	....
T	lb.	1.10	1.50
R	lb.	1.60	2.00
40C	lb.	.55	.75
UC XK-1960*	lb.	5.50	—

Selenium

Vandex*	lb.	—	7.00
VA-7*	lb.	—	.50

Sulfur

Blackbirdd* (c.l.)	cwt.	—	2.90
Cloud* (c.l.)	cwt.	—	2.85
Crystex*	lb.	.19½	.23
Darex Dispersed Sulfur*	lb.	.14	.16
Devil A* (c.l.)	cwt.	—	2.45
Dispersed Sulfur	lb.	.14	.16
Insoluble Sulfur 60*	lb.	.12½	.13
Ko-Blend IS*	lb.	—	.39
Mist* (Wettable) (c.l.)	cwt.	—	4.05
Spider* (c.l.)	cwt.	—	2.85
Star* (c.l.)	cwt.	—	4.90
Sulfasan R*	lb.	—	1.55
Tire* (c.l.)	cwt.	—	2.45
Tube* (c.l.)	cwt.	—	4.90
Vultac 2*	lb.	.47	.74
3*	lb.	.51	.78

Tellurium

Telloy*	lb.	—	4.00

WETTING AGENTS

Advawet No. 10*	lb.	—	.17
No. 33*	lb.	—	.48
Aerosol 18*	lb.	.37	.42
AY*	lb.	.75	.80
MA 80%*	lb.	.40	.45
OT 75% Aqueous*	lb.	.40	.45
OT 100%*	lb.	.75	.80
OT-B*	lb.	.65	.70

WETTING AGENTS (Cont'd)

Alrosol* (dms.)	lb.	.36	.40
Alrosperse*	lb.	—	.18
Alrowet D 65*	lb.	.31	.34
Anhydrol 6990* 6991*	lb.	.51	.56
Armacs*	lb.	.28	.77
Arquads*	lb.	.42	.61
Emcol 5100* (dms.)	lb.	—	.31
Energetic W-100	lb.	.28½	.35
Etho-Chemicals*	lb.	.26	.58
Ethomeen S/15*	lb.	.48	.50
T/15*	lb.	.46	.48
Hyonic PE-90*	lb.	.25	.27
PE-100*	lb.	.25	.27
Kessco E-122* (dms.)	lb.	—	.45
18201*	lb.	—	.32
Kreelon 4D* (dms.)	lb.	.13	.16
8G* (dms.)	lb.	.26	.28
Kyro EO* (dms.)	lb.	—	.29¾
Modicol N*	lb.	.42½	.44½
S*	lb.	.30⅞	.32⅞
Nacconol A* (dlvd.)	lb.	—	.52
NRSF* (dlvd.)	lb.	.40½	.45
SL* (dlvd.)	lb.	.084	.10
60S* (dlvd.)	lb.	.19	.225
Nekal WS-25	lb.	—	.38
WS-99	lb.	—	.95
Orvus AB Granules*	lb.	.16¼	.17¾
Parnol*	lb.	—	.13½
Regal Beads	lb.	.12¾	.16¾
H. D. Beads	lb.	.12¾	.15¾
Santomerse No. 3 Paste*	lb.	.26	.30
Sorapon SF-73*	lb.	—	.18
SF-78*	lb.	—	.30
Sorbit P*	lb.	.29	.31
Soybean Lecithin	lb.	.13	.17
Stablex G*	lb.	.50	.90
Tergitol 4* (dms., dlvd.)	lb.	.36½	.37½
7* (dms., dlvd.)	lb.	.43½	.44½
O8* (dms., dlvd.)	lb.	.36½	.37½
P28* (dms., dlvd.)	lb.	.18½	.19
Trenamine W-30	lb.	—	.15
Vultamol*	lb.	—	.17½
Wetsit Conc.*	lb.	.35	.35

MISCELLANEOUS CHEMICALS

Aquesperse 30*	lb.	—	.11
Chiplac Paint	gal.	1.15	5.00
Copper Inhibitor No. 50*	lb.	—	1.20
D-Tac*	lb.	—	.22
Elastopar	lb.	2.05	2.07
2-Ethyl Hexanol	lb.	.23¾	.24¾
Fura-Tone Resin 1226*	lb.	.41	.43
MODX*	lb.	.38	.40
Nacconates*	lb.	.75	4.50
Para Resins*	lb.	.04	.04½
Pigmented Filmite* (dlvd.)	lb.	.16¼	—
Resorcin, Tech.	lb.	.77½	.81½
Rio Resin*	lb.	.70	.72
Rongalite CX*	lb.	—	.21½
Sherosopes*	lb.	.13½	.18¾
Sublac Resin PX-5*	lb.	.23½	.24½
Synpep*	lb.	.54	.60
Tysonite*	lb.	.30	.30½
Vanfre*	gal.	2.45	3.00
No. 3* & No. 4*	gal.	1.95	2.00

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See page 91

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Experienced Assistant or Production Manager to manage production activities. Knowledge in any of the following areas of silicones, compounding, extrusion and molding or combination of these areas desirable. Individual will have complete independence in managing plant production activities and a major role in top management decisions.

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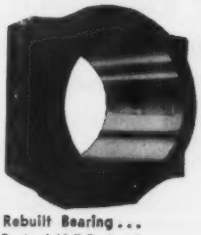

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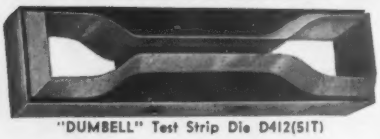

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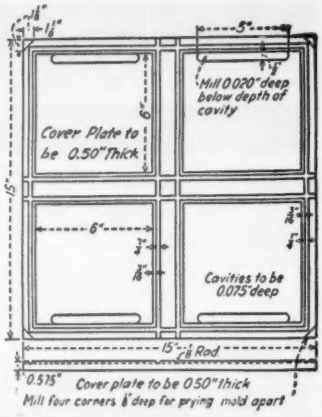
For making tensile test samples, we make many types of slab molds. One is detailed at the right. These are plain or chrome finished. We usually stock molds for making adhesion, abrasion, flexing, compression and rebound test samples, but supply special molds promptly. We also furnish hand-forged tensile dies for cutting regular or tear test samples.

SLAB MOLD D15-55


Mill 0.020" deep below depth of cavity
Cover Plate to be 0.50" Thick
Cavities to be 0.075 deep
15" - ½ Rod
0.515" Cover plate to be 0.50" Thick
Mill four corners ⅛" deep for prying mold apart

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Pac. Coast: H. M. Royal, Inc., Downey, Calif.

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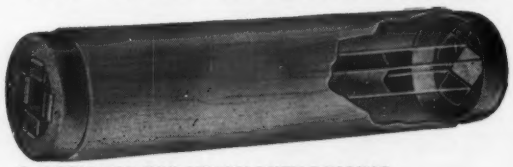

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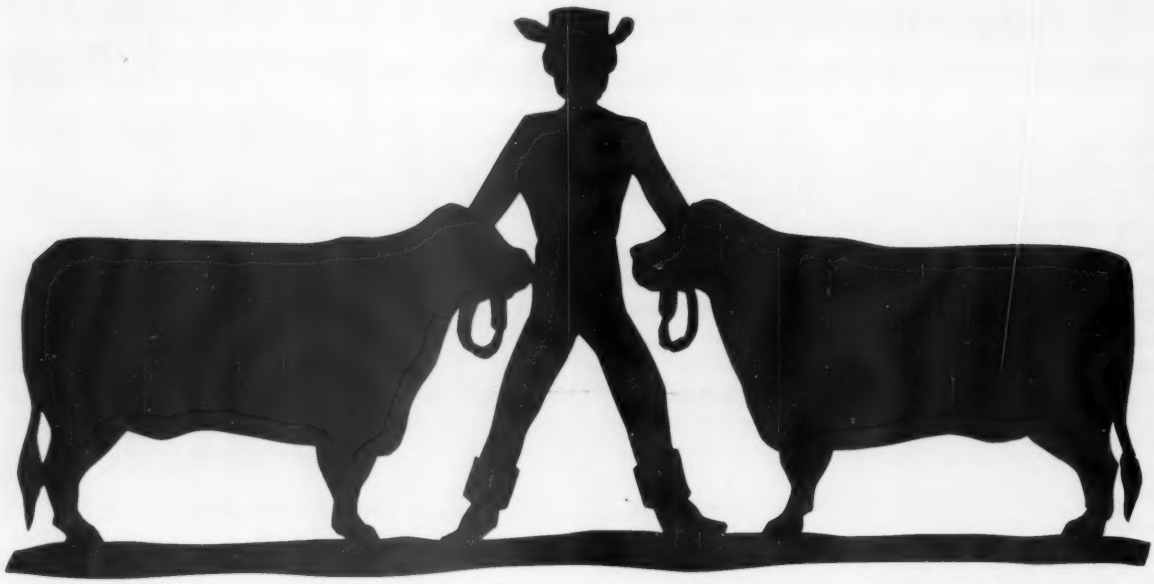

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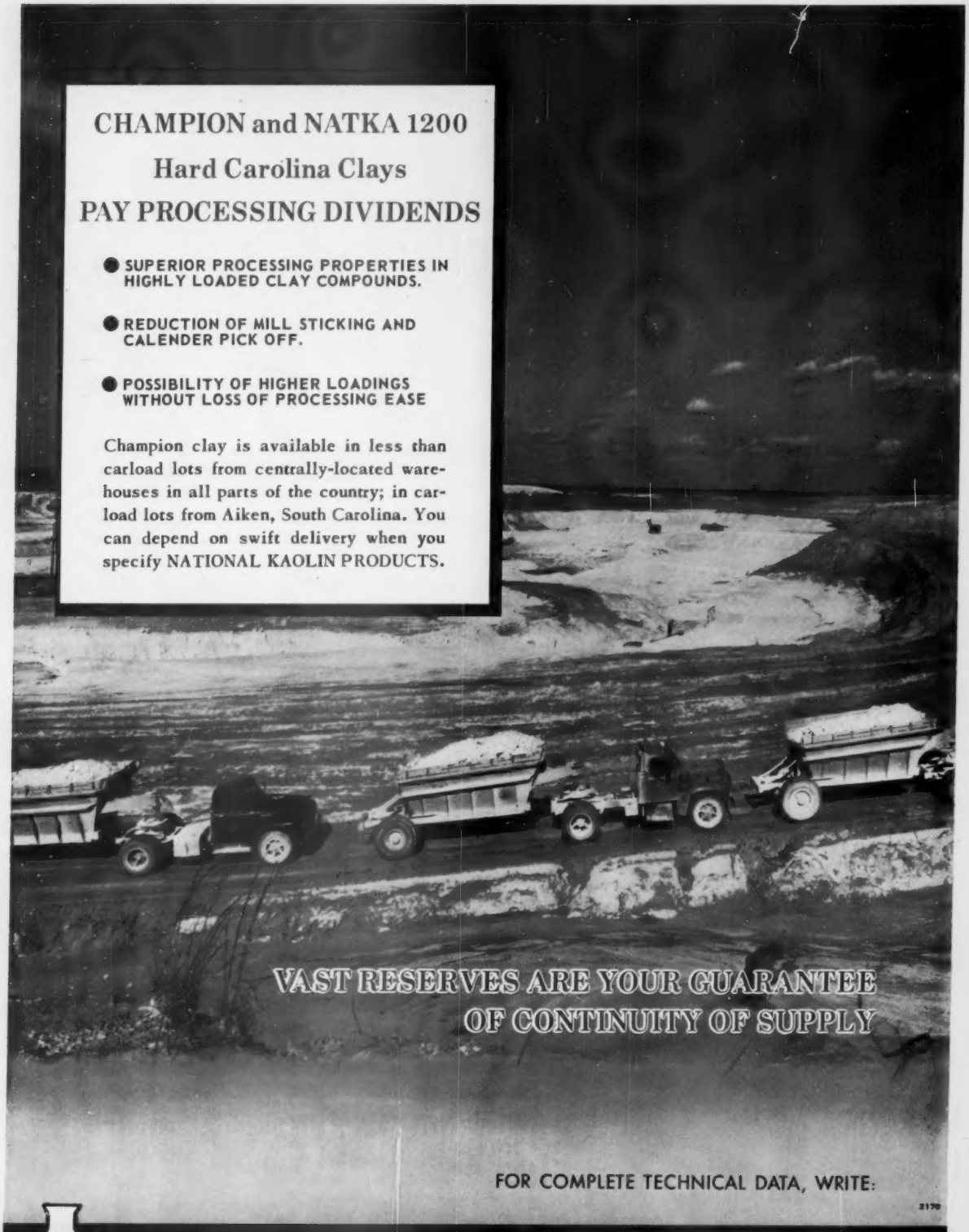
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